
CONSTRUCTION & PROFESSIONAL SERVICES MANUAL – 2004

CHAPTER 7: TECHNICAL STANDARDS FOR BUILDINGS ON STATE PROPERTY

700 GENERAL

This Chapter contains Division of Engineering and Buildings (DEB) Standards which clarify of the applications of Uniform Statewide Building Code (USBC) requirements as they pertain to buildings on state property, DEB Standards as they pertain to buildings on state property, and technical requirements for all state owned buildings and structures. The USBC is, in many respects, a performance code. The requirements in Chapter 7 prescribe the standards and requirements for buildings on state property which may be higher than the minimum requirements for the private sector owner but are necessary to meet the energy, performance, maintenance, safety and accessibility standards for public buildings. The agency and A/E must design the facilities to meet the standards and requirements stated in this Chapter.

SECTION 701.0 BUILDING CODES & APPLICATION OF REQUIREMENTS

Codes and standards applicable on all state owned buildings and structures.

701.1 Administration: The *Code of Virginia* delegates authority for Building Code enforcement in state buildings to the Department of General Services (DGS) acting through the Division of Engineering and Buildings (DEB), and to the Department of Housing and Community Development (DHCD) acting through the State Fire Marshal's office (FM). DHCD is charged with adopting a USBC and the State Fire Marshal is charged with providing assistance to DEB in enforcing the Building Code and inspecting state-owned buildings (§ 36-98, *Code of Virginia*).

DGS, acting through the Division of Engineering and Buildings, is the designated building official for state-owned buildings. DEB is charged with reviewing plans and specifications, granting modifications, issuing Building Permits, issuing Certificates of Occupancy, and establishing rules and regulations as may be necessary to carry out its function as building official (§ 36-98.1, *Code of Virginia*).

DGS (DEB) and DHCD (FM) share responsibility for administering the Building Code as it applies to state-owned buildings. The Memorandum of Understanding that outlines their respective responsibilities is contained in Appendix L.

701.2 Building Code: Virginia Uniform Statewide Building Code (VUSBC)

The Building Code for all state-owned buildings is the current edition of the Virginia Uniform Statewide Building Code (VUSBC) with supplemental requirements, instructions and modifications are as indicated in this Manual.

701.3 Accessibility Standards: Uniform Federal Accessibility Standards (UFAS) 1988 edition Accessibility standards for all state-owned buildings are as indicated in this Manual. VUSBC Chapter 11 and VUSBC-IPC Section 404 do not apply, except as indicated in this Manual. In case of conflict, the Manual requirements apply.

701.4 Energy Conservation Standards: Energy Conservation Standards for all state-owned buildings are as indicated in this Manual. In case of conflict, the Manual requirements apply.

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701.5 Life Safety Code: Life Safety Code (NFPA 101) applies only to state hospital and health care facilities accredited by the Joint Commission on Accreditation of Hospitals (JCAH) and accepting federal Medicare/Medicaid funds. In case of conflict, the most stringent requirements apply.

701.6 Other Federal or State Regulations: Certain projects may be required to comply with other federal or state regulations. Those requirements may take precedence equal or exceed construction, health, safety, and welfare standards regulated by the aforementioned standards, and are approved after DEB review. All such codes shall be clearly stated in the Schematic Documents and displayed on title sheets of Preliminary and Working Drawings. The following codes and regulations apply to state projects:

Title II, Americans with Disabilities Act

Public Building Safety Regulations

Industrialized Building and Mobile Home Safety Regulations

Amusement Device Regulations

Virginia Statewide Fire Prevention Code

Certification of Tradesmen Standards

Department of Conservation and Recreation - Erosion and Sediment Control Regulations
(VR 625-02-00)

Department of Conservation and Recreation - Stormwater Management Regulations
(VR 215-02-00)

Department of Health Regulations

Department of Environmental Quality, Water Division, Regulations

701.7 Applicable Code: It is desired that state buildings be designed to conform to the latest code requirements.

701.7.1 New Work: A/Es should project when working drawings will be completed and determine what code(s) will be in effect at that time. In cases where working drawing completion is projected to take place after the effective date of a new edition of VUSBC, A/Es should obtain copies of the proposed ICC codes and design the project to conform to the latest requirements if reasonably possible. Mixing of code requirements between two editions of the code are not allowed.

1. The applicable code will be the VUSBC edition in effect at the time outstanding issues have been resolved, preliminary drawings are approved (usually on the CO-5), and authorization is given to proceed with development of the working drawings.
2. If preliminary drawings are approved during the 12 months before the effective date of a new edition of VUSBC, the applicable code will be designated by BCOM at the time of the preliminary approval.
3. If construction of the project does not begin within one year of the approval of the CO-6, the agency shall request, in accord with Section 700A.3.3 below, confirmation from BCOM as to what code applies.

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701.7.2 Reactivated Projects: Prior to reactivating a project that has been inactive for a period during which the effective code has changed; the Agency shall contact the Bureau of Capital Outlay Management for a determination of what code applies. BCOM will confirm any change of code in writing. The plans and specifications shall be revised as necessary to comply.

701.8 Modifications of Code Requirements: If after discussions with the Agency a modification to the requirements of the code is thought to be necessary, the head of the Agency shall request such modification in writing at the time preliminaries are submitted. The request shall clearly state the nature of the problem and the supporting rationale and justification for the modification. All requests to waive or grant a modification to the requirements of the VUSBC will be addressed to the Director of the Division of Engineering and Buildings.

701.9 Code Clarifications: Code clarifications requests should be made in writing to the BCOM Director. The following are code clarifications shall be applied to state owned buildings and structures:

701.9.1 Buildings at Colleges and Universities:

1. Buildings for business and vocational training shall be classified and designed for the Use Group corresponding to the training taught.
2. Academic / educational buildings having classroom-type education functions (including associated professor / teacher office spaces), shall include the following additional requirements:
 - a. Provide a Fire Protection Signaling System in the building
 - b. Provide 72" minimum corridor widths in the classroom corridors
 - c. Calculate the occupant load for each space based on VUSBC Chapter 10 and the type of occupancy (not Group) of the space.
3. Buildings housing research, testing and science laboratories shall include a Fire Protection Signaling System
4. Dormitories, Fraternity and Sorority Houses and similar dwelling units with sleeping accommodations – provide one of the following:
 - a. University Policy which prohibits the use of these residences from house occupants for periods of less than 30 days, or
 - b. Design that complies with the most stringent requirements of both Group R-1 (Hotels) and Group R-2 (Dormitory)

701.9.2 Residences for Rent

Cabins, Beach Houses, Lodges, and similar dwelling units with sleeping accommodations rented to family groups:

1. Residences for Rent for less than 30 days with a Maximum Occupant Load of 16 shall comply with the requirements for Use Group R-3 (Group R-3)
2. Residences for Rent for less than 30 days with a Maximum Occupant Load of more than 16 shall comply with the requirements for Use Group R-1 (Group R-1)

701.9.3 Temporary Change of Use and Occupancy

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Temporary change of use and occupancy requires a Temporary Certificate of Occupancy. (Examples include dormitories rented for less than 30 days, armories used as sleeping quarters, and storage spaces used for business or assembly.) The application for Temporary Certificate of Occupancy must be complete, and include an Operational Policy that provides safety measures to address the life, health, and welfare of the occupants.

701.9.4 Maximum Occupant Load

In determining the means of egress requirements, the number of occupants for whom means of egress facilities shall be provided shall be established by the largest number computed in accordance with the Actual number, Maximum Floor Area Allowance per Occupant, and Number by combination.

1. **Actual Number:** The actual number of occupants for whom each occupied space, floor or building is designed.
2. **Maximum Floor Area Allowance per Occupant:** The number of occupants computed at the rate of one occupant per unit area as prescribed in the Maximum Floor Area Allowance per Occupant table in the applicable Virginia Uniform Statewide Building Code.
3. **Number by combination:** Where occupants from an accessory space egress through a primary space, the calculated occupant load for the primary space shall include the total occupant load of the primary space plus the number of occupants egressing through it from the accessory space.

701.9.5 Safety Equipment Not Required by Code

Safety equipment, including Fire Detection, Fire Alarm, and Fire Suppression Systems, which are not required by code, but are provided at the Owner's option in state owned buildings and structures shall be complete in accord with the code. Work that is planned as a complete system, but requires phased construction to provide a complete system is acceptable. Incomplete systems are considered to be hazardous because such systems create a false sense of security for the occupants, and may result in life or fire hazards to adjacent areas. However, providing 'partial systems' to certain spaces such as storage spaces which will improve safety and not give a false sense of security to building occupants will be considered on a case-by-case basis where 'partial systems' are allowed by the USBC.

701.9.6 Stairways: The leading edge (intersection of the tread and riser) of stairways shall be perpendicular to the direction of travel. Stairways where the direction of travel is at an angle to the leading edge of the stairway are not acceptable.

701.9.7 Reroofing – Secondary (Emergency) Roof Drains: If Secondary (Emergency) Roof Drains are not a part of the existing construction, then Secondary (Emergency) Roof Drains shall be provided for all reroofing work. If the average depth of accumulated water exceeds 4 inches, then structural calculations shall be submitted that demonstrate that the structure is adequate to sustain the accumulated water up to the elevation of the Secondary (Emergency) Roof Drains in accord with ASCE 7, Section 8.5.

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701.9.8 Roof Load: The minimum design superimposed load for flat roofs and roofs with a slope of less than four (4) inches per foot shall be as indicated on the following Figure 701.9.8, Minimum Superimposed Loads for Design of Low-Sloped Roofs. Generally, roofs in areas in and west of the Blue Ridge Mountains and the indicated areas of Northern Virginia shall be designed for a minimum design superimposed load of 30 pounds per square foot. Indicated areas east of the Blue Ridge Mountains shall have a minimum design roof superimposed load of 20 pounds per square foot for roof design. Greater live, snow and/or combination loads shall be used where local experience, calculations, drifting or other conditions dictate.

701.9.9 Snow Load: All new buildings and additions shall be designed for snow loads as required by the VUSBC (International Building Code).

701.9.10 Wind Loads: All new buildings and additions shall be designed for wind loading as required by the VUSBC (International Building Code). See VUSBC Table 1609.

701.9.11 Seismic Loads: All new buildings and additions shall be designed for seismic loading as required by the VUSBC. See Figures 701.9.11A and 701.9.11B for maps clarifying seismic coefficients S_1 and S_S . When a Project is located between contours, use straight line interpolation or the value of the higher contour.

701.9.12 Design Data: The Structural Design Data given on the Construction documents shall comply with VUSBC 1603 and unless meeting the exception in VUSBC 1603.1, shall include the following additional information.

- Building Category from VUSBC Table 1604.5. Note: Do not use Table 1-1 in ASCE 7.
- Seismic Criteria: S_S from VUSBC Figure 1615(1), S_1 from VUSBC Figure 1615(2), R from VUSBC Table 1617.6, and the Seismic Design Category from VUSBC 1616.3.

701.9.13 Quality Assurance: When required by VUSBC 1705 or 1706, a Quality Assurance Plan shall be prepared and noted as such in the Construction Documents. The Project Manual shall include Form DGS-30-053, CO-6c, "Contractor's Statement of Responsibility for Quality Assurance".

701.9.14 Addition of Loads to Existing Structures: Prior to mounting any antennae, microwave dishes, HVAC equipment or other items on the roof of an existing building, **the adequacy of the structural framing to support the additional live, dead, wind and lateral loads shall be checked by a licensed structural engineer.** Consideration must be given to deflection from the added load(s), to potential for vibration, to potential for ponding water, and to the consequences of overturning moments on stressed attachments and construction.

701.9.15 ANSI/ASME A17.1, Rule 102.2(c) (4): In order to prevent people from being trapped in an elevator when power is automatically disconnected in accord with the requirements of ASME/ANSI A17.1, Rule 102.2 (c) (4), the policy below shall be applicable for all new and remodeled state building elevator systems.

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Before power is automatically disconnected in accord with ASME/ANSI A17.1, Rule 102.2 (c) (4), provide controls necessary to send the elevator a safe designated recall level with a means of egress. This may be accomplished by one of the following:

1. Heat detectors required by Rule 102.2 (c) (4) shall provide a signal to initiate Phase I Fireman's Service Emergency Recall Operation Rule 211.3a. The activation sequence shall be similar to requirements for smoke detectors in Rule 211.3b. No additional heat detectors are required other than those called for by Rule 102.2(c) (4).
2. Provide an elevator travel time delay, equivalent to the elapsed time for an elevator to travel from its farthest stop to the designated recall level plus ten (10) seconds before power to the elevator equipment is disconnected and pre-action sprinkler is activated as required by Rule 102.2(c)(4). [Elevator Travel Time Delay = the time for an elevator to close its doors, under Phase I conditions, return to the designated recall level, and open its doors. If there are multiple elevators, the elevator having the greatest travel time shall be used in determining the time delay.] See Sample Circuitry Diagram in Figure 701.9.15.

701.10 State Building Construction in Flood Plain: Executive Memorandum 2-97 prohibits the construction of new state-owned buildings within the 100-year flood plain unless a variance is granted by the Director, Division of Engineering and Buildings, acting in his capacity as Building Official for state-owned buildings, and after consultation with the State Coordinator for the National Flood Insurance Program [the Department of Conservation and Recreation (DCR)]. A copy of Executive Memorandum 2-97 has been included in Appendix J for information.

701.11 Fire Safety Review: Fire Safety reviews will be performed by the Bureau of Capital Outlay Management for projects in accord with Building Permit Policy for Construction – State Owned Buildings and Structures located in Appendix P.

Exception: Minor alterations such as relocating sprinkler head within a space or addition of not more than 4 sprinkler heads may be reviewed and approved by the Regional Office of the State Fire Marshal.

701.12 Fire Protection Shop Drawings: Fire Suppression, Fire Detection, and Fire Alarm Shop Drawings shall be reviewed and approved prior to the work being installed. Where a complete fire protection system is design and shown on the construction documents approved for bidding, the A/E may include a stipulation on the drawings and in the technical specification that the “Contractor shall bid and install the fire protection system as shown in the documents. Deviations in materials, locations, configurations or sizes proposed by the Contractor will be reviewed under the provisions of Section 26 of the General Conditions as a ‘Substitution’.”

701.12.1 A/E Shop Drawing Review: When the design (including Fire Suppression and Fire Detection & Alarm) is complete and code compliant at the Working Drawing submittal, then Shop drawings and submittal data shall be reviewed and approved by the A/E of record. Where the Agency permits the A/E to show an incomplete fire protection system design on the Working Drawings / construction documents, the A/E shall review and approve the fire

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protection shop drawings and then submit the A/E approved Fire Protection Shop Drawings to BCOM for final approval of conformance with the Codes and Standards.

701.12.1 BCOM Shop Drawing Review: When the design (including Fire Suppression and Fire Detection & Alarm) is not complete or not code compliant, at the Working Drawing submittal, then Shop drawings and submittal data shall first be reviewed and approved by the A/E of record. The submittal, with any added notations, is satisfactory to the A/E; the A/E shall so stamp and send one copy of such documents to BCOM for final review and approval.

701.13 Construction Inspection: In addition to the required Structural and Special Inspections, A/E Inspections, and Substantial Completion Inspection by the Building Official, the Owner shall cause Construction Inspections to be made to assure that the work performed is in accord with the approved Building Permit documents. See Chapter 10 for information on the scope of Structural and Special Inspections and the A/E Inspections.

701.13.1 Required Inspections: Inspections shall be performed in accord with the code, including the following:

1. Footing, excavations, and reinforcement materials for concrete footings prior to concealment
2. Foundation systems during periods of construction necessary to assure code compliance.
3. Preparatory work prior to the placement of concrete
4. Structural members and fasteners prior to concealment
5. Electrical, mechanical, and plumbing materials, equipment, and systems prior to concealment
6. Energy conservation material prior to concealment
7. Fire Suppression Sprinkler / Clean Agent System prior to concealment
8. Fire Detection & Alarm System prior to concealment

(Note: Part of Required Inspections may be included in the Structural and Special Inspections and the A/E Inspections, despite this, Construction Inspections shall be made of the work as it is being performed to assure that conditions inspected by the Structural and Special Inspections and the A/E Inspections are preserved.)

701.13.2 Inspector Qualifications: Inspectors shall be approved by the Agency's Director of Facilities. Inspections shall be made by an individual familiar with the project, with the knowledge, skill, and experience necessary to read and understand the documents, and meeting the following minimum criteria:

1. Individual certified by the Department of Housing and Community Development in the specialty being inspected
2. Virginia licensed Architect or Engineer
3. Individual approved by the Building Official upon recommendation of the Agency Facilities Officer based on the knowledge, skill, and experience of the proposed inspector.

701.13.3 Inspection Reports: Inspection reports shall be made on all inspection work. Final Report shall be made at the completion of the work. Reports shall meet the following:

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1. Submitted within 30 days of completion of the work item being inspected and prior to the Substantial Completion Inspection.
2. Indicate deficiencies in the work shall be followed by reports that indicate the action taken to correct the work and acceptance of the work.
3. Formatted at the discretion of the Agency, but shall include a number and title (as indicated in Required Inspection), date, and signature of the Inspector. Final Report shall be so entitled, and indicate that the work was complete in accord with the approved Construction Documents (indicate the date of the approved Construction Documents and include a list of Addenda and Change Orders), or enumerate the deficiencies and corrective actions taken (do not include Addenda and Change Orders previously listed) to comply with the code.

701.13.4 Non-Compliance: If the Owner is unable or unwilling to perform the required inspection and reporting, then the Building Official will cause the inspections to be performed at the Owner's expense.

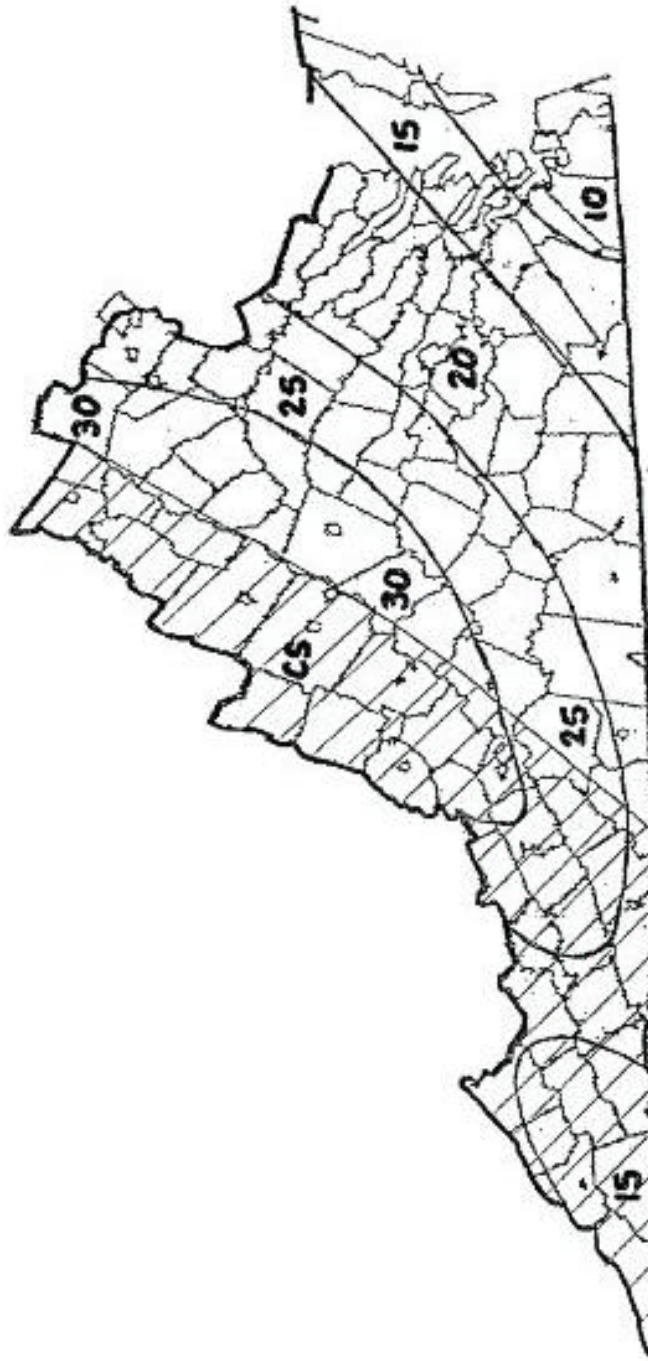
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Ground Snow Loads

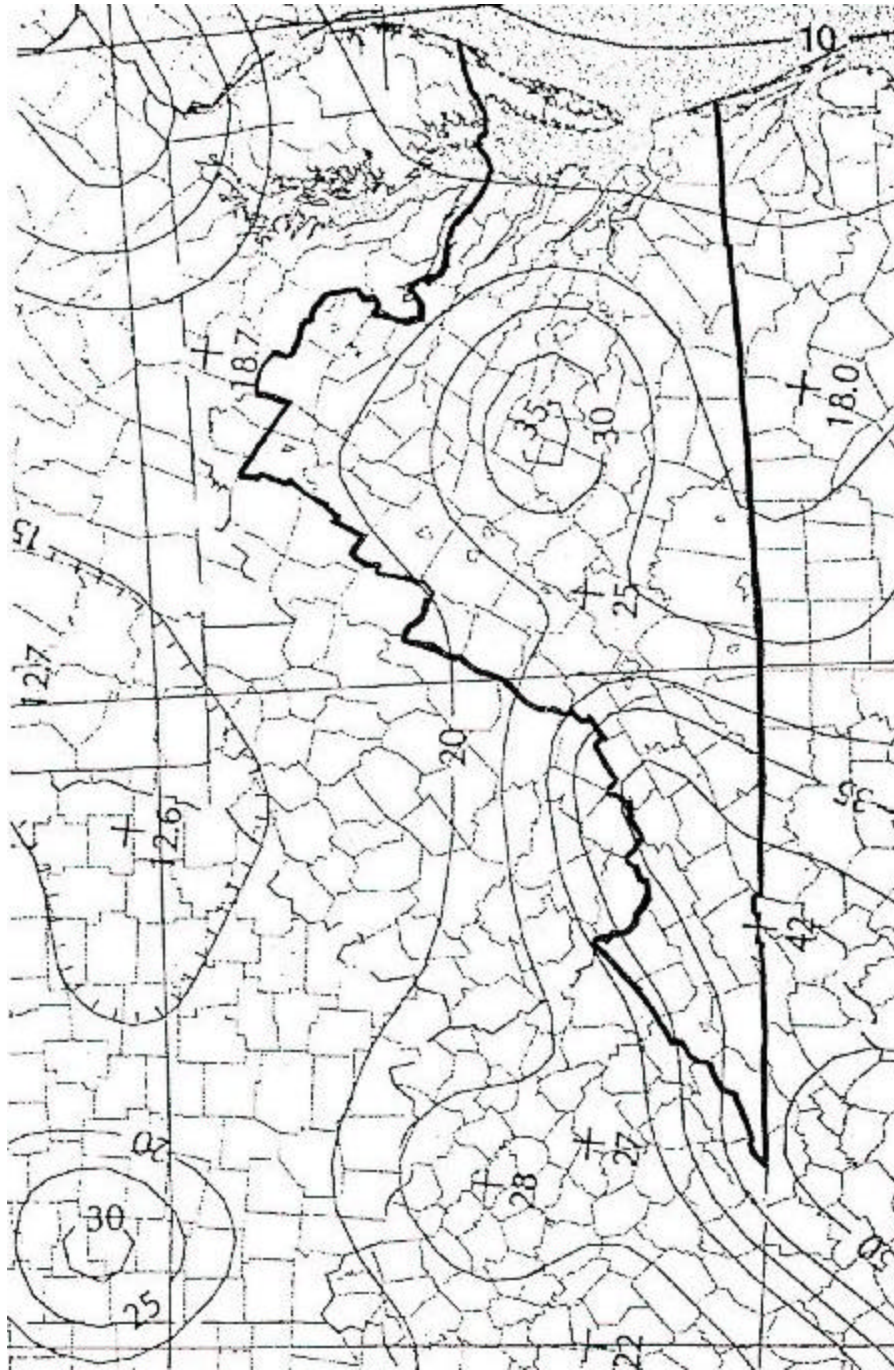
Taken from VUSBC Figure 1608.2

Courtesy of the International Code Council, Falls Church, Virginia.

Figure 701.9.9

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S_s , 0.2 sec. Spectral Response Acceleration, % g

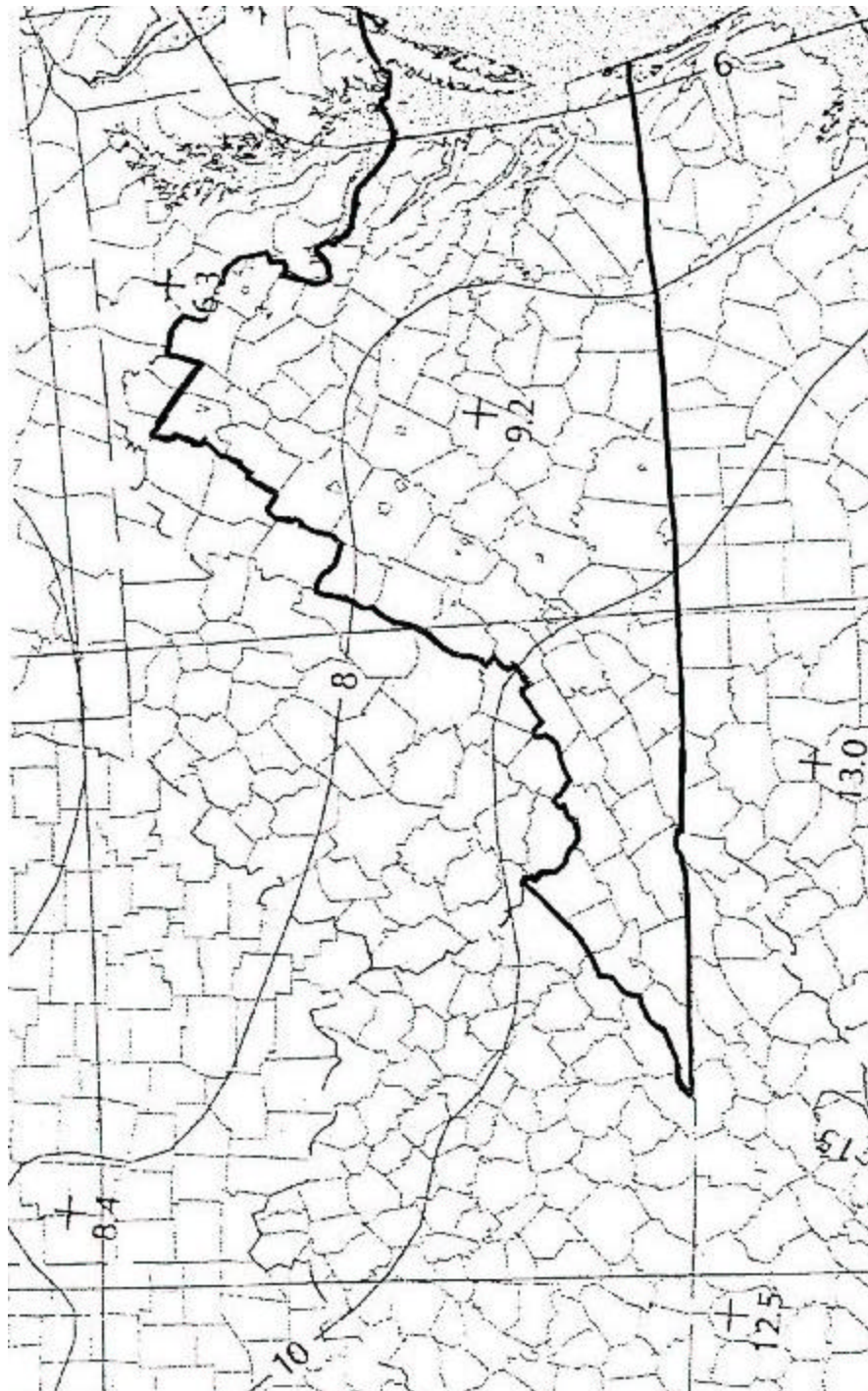
Taken from VUSBC Figure 1615(1)

Courtesy of the International Code Council, Falls Church, Virginia.

Figure 701.9.11A

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S_1 , 1.0 sec. Spectral Response Acceleration, % g

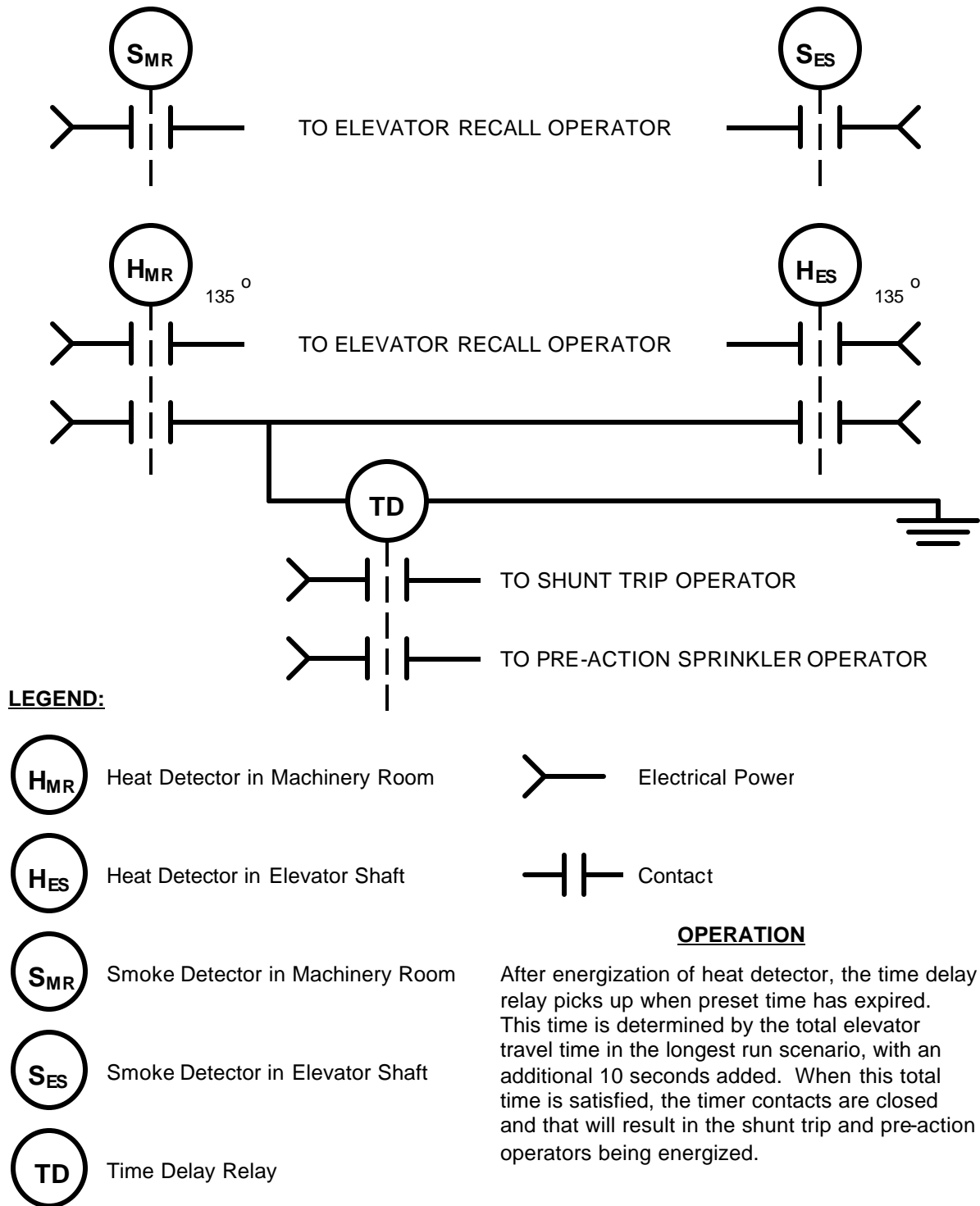
Taken from VUSBC Figure 1615(1)

Courtesy of the International Code Council, Falls Church, Virginia.

Figure 701.9.11B

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Elevator Recall Sample Circuitry Diagram

Figure 701.9.15

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SECTION 702.0 ACCESSIBILITY STANDARDS for STATE OWNED FACILITIES

The Americans with Disabilities Act, 1990: Title II, Subtitle A, (and not Title III) of the Act applies to all state owned buildings and structures. The accessibility standards are the Uniform Federal Accessibility Standards, 1988 edition. (Access Board, Suite 1000, 1331 F Street, NW, Washington, D.C. 20004-1111 or www.access-board.gov) For technical assistance, call the Office of Technical and Information Services at (202) 272-2253 or email ta@access-board.gov. In addition, Non-Discrimination Under State Grants and Programs promulgated by the Board for Rights of Virginians with Disabilities and effective on October 1, 1990, implement § 51.5-40, Code of Virginia applies.

702.1 Alternate Accessibility Standards: Since the adoption of the Americans with Disabilities Act of 1990 (ADA), there have been updates to the ADA Accessibility Guidelines (ADAAG) for public accommodations (Title III, private sector). To date, there have been no updates to state and local government service (Title II, public sector) accessibility standards. The development of ADAAG for State and Local Government Facilities (ADAAG-SLGF) has stopped. To date, the VUSBC has not been certified by the Department of Justice as being an equivalent accessibility standard that complies with ADA. Upon adoption of ADAAG-SLGF, or certification by the Department of Justice that the VUSBC is an equivalent accessibility standard that complies with ADA90, a new standard will adopted by amendment to this Manual. Until that time, the Uniform Federal Accessibility Standards (UFAS) apply.

702.2 Conflicting Standards / Modifications: Where standards conflict, the most stringent standard shall be used in designing accessible facilities. That is, the standard most favorable or advantageous to the disabled shall be used. As ADA is a federal law, modification of the requirements cannot be granted by The Division of Engineering and Buildings. The Division of Engineering and Buildings reviews documents for compliance with these Standards during its normal review of capital outlay projects. Such review does not relieve design consultants from responsibility for designing in accord with the standards and Federal Law.

702.3 Clarifications for State Owned Buildings: Accessible facilities must be provided at the completion of construction. Adaptable facilities do not meet the requirements for accessibility in state buildings.

702.3.1 Unisex Toilets and Bathing Rooms: Provide Unisex Toilets and Bathing Rooms in accord with the Virginia Uniform Statewide Building Code current edition.

702.3.2 Water Closet Compartments: Provide Water Closet Compartments in accord with the Virginia Uniform Statewide Building Code current edition. Private toilets that serve non-accessible private dormitory rooms on accessible floors are not required to be accessible.

702.3.3 Laboratories: A minimum of five percent of the stations within each laboratory, but no less than one station and one of each type of service facility within the laboratory, shall comply with requirements of the standards.

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702.3.4 Physical Education Buildings: Locker or Dressing rooms, a minimum of 5 percent of lockers (but no less than one) and one of each type of service shall comply with these standards.

702.3.5 Elevator Access: Floors and rooms of all facilities with more than one story of new construction or altered space shall be accessible by elevator unless access is provided by other means or unless the Director of the Division of Engineering and Buildings waives the requirement on written request of and justification by the owning agency. All passenger elevators shall be accessible to the disabled.

702.3.6 Windows: UFAS Sections 4.12 and 4.34.2(5), said to be reserved. In the absence of specific requirements, windows shall be designed in accordance with Section 506 of ICC / ANSI A117.1-1998.

702.3.7 Exterior Hinged Doors: UFAS Section 4.13.11(2) (a), said to be reserved. In the absence of a requirement for closing speed and opening force, doors shall comply with Sections 404.2.8 and 404.2.9 of ANSI A117.1-1998.

702.3.8 Tactile Warnings: Deleted.

702.3.9 Erratum: UFAS, Section 4.1.5, Paragraph (1): Change 4.1.4 to 4.14.

702.3.10 Seating for Assembly Areas: UFAS Sections 4.1.2(18)(a), 4.33.2, and Figure 46: A Location is a seating area for at least one person in a wheelchair. Figure 46 shows minimum space requirements for locations for both single and multiple wheelchairs. The minimum dimension of a location for a single wheelchair user who enters from the front or rear is 33" X 48". The minimum for a user who enters from the side is 33" X 60". (Verbal clarification from the ATBCB is that location means a seating space for one wheelchair user, not two as shown in Figure 46.)

702.3.11 Stairs: The following requirements apply to the design of all stairs for state-owned buildings, except for stairs to or in service spaces listed in UFAS 4.1.4(1):

1. All stairs, stairways and steps shall be accessible and comply with UFAS 4.9 in all areas for which the intended use will require public access or which may have physically handicapped employees. The presence of accessible ramps or elevators shall not void this requirement.
2. Open risers shall not be permitted in stairs on state projects – including stairway aisles in stadiums and auditoriums.
3. Stair/step configuration shall conform to Figure 18 of UFAS, ADAAG and ANSI A117.1-1998.
4. All required handrails shall be accessible. Handrail extensions shall not be turned to the side or back. Handrail extensions shall continue straight and parallel to the stair run.
5. The use of winders, spiral stairs, and alternating tread stairs as permitted by the code shall be limited by these requirements.

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702.3.12 Area of Refuge: An Area of Refuge shall be at least one accessible area not less than 30 inch by 48 inch that does not encroach on the required exit width.

Intent: The International Building Code (as adopted by the Virginia Uniform Statewide Building Code) states the purpose of means of egress:

“A primary purpose of codes in general, and building codes in particular, is to safeguard life in the presence of unwanted fire...Integral to this purpose is the path of egress travel for the occupants to escape and avoid a fire. Life safety from a fire is a matter of successfully evacuating or relocating occupants of a building to a place of safety. As a result, life safety is a function of time for detection; time for notification; and time for safe egress.” Persons are taught from early childhood that they are to evacuate the building when the Fire Alarm sounds. The able-bodied, as well as the mobility impaired, look for and go to the ‘EXITS’. The intent of the Area of Refuge is to provide a safe place at an Exit Stair on the ‘Exiting’ or Egress route for disabled people to wait for assistance in evacuating the building.

Authority: Code of Virginia, Section 2.1–516, states *“The Division of Engineering and Buildings shall prescribe such standards for the design, construction, and alteration of buildings constructed in whole or part or altered by the use of state funds, other than school funds, as may be necessary to insure that physically handicapped persons will have ready access to, and use of, such buildings.”*

ADA 90: Americans with Disabilities Act of 1990, Title II, Uniform Federal Accessibility Standards, adopted by the Construction and Professional Services Manual follows:

“Section 4.3.10, Egress - Accessible routes serving any accessible space or element shall serve as a means of egress for emergencies or connect to an accessible place of refuge. Such accessible routes and places of refuge shall comply with the authority having jurisdiction (Division of Engineering and Buildings).”

Factors used in establishing this standard include:

1. Exit from a building in case of fire, or relocation of occupants to a place of safety, is a minimum right for everyone - not just the able bodied.
2. Sprinklers retard, but do not necessarily stop, fire and do not stop smoke.
3. The presence of sprinklers in a building does not eliminate the need for a Fire Alarm.
4. Governmental services provided in state owned buildings result in an increased number of handicapped in state buildings, both employees and visitors.
5. Evacuation plans are highly dependent on responding personnel at the time of the incident while built-in features are a permanent and dependable part of the structure.

Conclusion: The ‘Area of Refuge’ policy is intended to provide a standard and dependable feature in state buildings for occupants and rescuers, and to assure equal access by providing a standard of life safety for the handicapped equal to that of able bodied people who are capable of exiting a building.

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702.3.12.1 Number required

1. An Area of Refuge shall be provided at each exit of each occupiable level required to be accessible, and at each exit of each occupiable level in existing construction made accessible by the addition of an elevator.
2. If only one exit is required then a minimum of two 30" X 48" areas shall be provided at that exit.
3. One 30" X 48" area shall be provided at each required Area of Refuge on each occupiable level for each 200 persons of required exit capacity.
4. The total number of 30" X 48" areas for assembly occupancies (or other areas requiring a minimum number of wheelchair locations) shall be equal to at least the number of individual wheelchair locations required by the applicable standard.

Exception 1: An Area of Refuge is not required for fully accessible exits.

Exception 2: The requirements associated with Area of Refuge for Construction and Stairway Width may be waived in existing buildings upon application to the Director of DEB and evidence that modification of these building elements is *structurally impracticable*.

Exception 3: An Area of Refuge, and the requirements associated with Area of Refuge for Construction and Stairway Width, is not required in occupancies equipped throughout with an automatic sprinkler system in accord with NFPA 13. If the agency takes this 'Exception' in the design of the building, the agency shall provide the Director of DEB a written statement that it has directed the A/E to incorporate this 'Exception' in the building design. The Agency Head shall be responsible for assuring that an evacuation plan is in place for the building and that mitigating life and fire safety measures have been taken to assure that the mobility impaired are provided the opportunity to exit and are protected in a fire emergency in accord with the ADA90 concept of equal access.

Factors to be considered when evaluating the "Exception" for a fully sprinklered building include:

1. Building Height - Allowable vs. Actual
2. Building Area - Allowable vs. Actual, Combustible or Noncombustible
3. Compartmentation
4. Tenant and Dwelling Separations
5. Corridor Walls - Fire Rating
6. Vertical Openings - Height, Fire Separation
7. HVAC Systems – Resistance to the movement of smoke and fire
8. Automatic Fire Detection - Type, Location
9. Fire Alarm Systems - Type, Location
10. Smoke Control - Type, Location
11. Means of Egress - Number, Location, Capacity
12. Elevator Control - Recall Control Capacity
13. Mixed Use Groups - Type, Area, Location
14. Emergency Evacuation Plan

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702.3.12.2 Accessibility

1. Areas of Refuge shall be clear of door swings and shall provide fully accessible entrances and exits.
2. The exit discharge shall provide an accessible route to a point 50 feet away from the building or to a public way.

702.3.12.3 Construction: An Area of Refuge shall conform to one of the following:

1. A portion of stairway landing.
2. A horizontal exit
3. A vestibule or room located immediately adjacent to, and opening into, the exit enclosure. The vestibule and room must be constructed to the same fire-resistive standards as the exit enclosure.
4. A portion of an exterior stairway landing, or an exit balcony located immediately adjacent to an exit stairway when the balcony complies with VUSBC for exterior exit balconies. Openings to the interior of the building located within a 10 foot radius of the Area of Refuge shall be protected with fire assemblies having a three-fourths hour fire protection rating.
5. In an open parking structure, a designated area located immediately adjacent to the stairway.

702.3.12.4 Stairway Width: Stairways serving an Area of Refuge shall be a minimum clear width of 48 inches between handrails.

702.3.12.5 Two-way Voice Communication: Two-way communication, with both visible and audible signals, shall be provided between each Area of Refuge and a central control point. If no central control point is located within the building, the communication system may alternatively dial 911 through the telephone lines to a local emergency service. Instructions on using the Area of Refuge in an emergency shall be posted next to the two-way communication system. Instructions shall include:

1. Directions to other means of egress
2. Advice that persons able to use the exits do so as soon as possible
3. Information on how to summon emergency assistance
4. Directions for use of the communication system

702.3.12.6 Identification: Each door providing access to an Area of Refuge from an adjacent floor area shall be identified by a sign, illuminated when exit sign illumination is required, that states Area of Refuge and displays the international symbol of accessibility.

SECTION 703.0 SPECIAL PROCEDURES FOR ASBESTOS ABATEMENT

Asbestos shall be abated in state owned buildings and shall not be included in new construction

703.1 General Asbestos Requirements: Buildings constructed prior to 1980 are presumed to have asbestos-containing materials (ACM) in materials including, but not limited to, asphalt and vinyl flooring, resilient floor covering, mastics, fibrous pipe insulations, caulking, roofing,

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flashings, bonding agents, coatings, and binders until such materials have been tested and found not to contain asbestos.

703.1.1 Renovation / Demolition / Addition projects in pre-1980 Buildings: Owner shall have all of the existing structures(s) surveyed/inspected by a Virginia licensed asbestos inspector for asbestos-containing materials (ACM) prior to submittal of the preliminary design for capital outlay projects, and prior to submittal of the construction documents for non-capital outlay projects. All suspect materials must be physically sampled and analyzed. The asbestos surveyor/inspector shall provide the Owner with a report of the survey/inspection which indicates those places where samples were taken, the results of the analyses, and drawings which indicate those areas, if any, where asbestos was found and where asbestos-containing materials must be abated or encapsulated. *(Note: It is recommended that the Agency have the testing performed prior to making its funding request. An estimated cost for asbestos abatement, if suspected, must be included in the cost estimate supporting the budget request.)*

The asbestos survey / inspection report must be made available to the project A/E for information and use in preparing the project documents.

If asbestos-containing materials are found, the Owner shall have a licensed asbestos designer in concert with the A/E prepare an asbestos abatement plan and prepare or update the agency Asbestos Management Plan as required by the Department of General Services letter dated May 1, 1989, and § 2.2-1164, Code of Virginia. The asbestos abatement contractor shall be required to mark up the Asbestos Management Plan to show the “As Built” conditions resulting from its work to include areas where asbestos was abated, areas where asbestos was encapsulated, and areas where asbestos containing materials exist but were left in place.

Based on the report of the asbestos survey/inspection report and the Asbestos Management Plan, the construction drawings for renovation or addition projects shall indicate all locations where ACM have been found, where ACM are to be disturbed and where ACM are to remain. The asbestos survey/inspection report and the Asbestos Management Plan must be made available for their respective information to the contractor(s) for demolition and for construction.

703.1.2 Roofing Materials: Roof shingles, built-up roofing, flashings, and mastics which contain asbestos materials shall be removed and disposed of in approved and licensed disposal sites in conformance with the recommendations contained in the Asbestos Survey / Inspection report and the Asbestos Management Plan.

703.2 Asbestos Disclosure Statement: The A/E shall note on the drawings and in the specifications for all projects that no asbestos containing materials shall be used on the project. The Demolition Plan sheets and the Architectural Floor Plan sheets for each floor shall also have an Asbestos Disclosure Statement indicating one of the following:

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1. *An asbestos inspection was performed and no asbestos-containing materials were found. The asbestos survey/inspection report is available to the Contractor(s) for demolition and for construction for his information.*
2. *An asbestos inspection was performed and asbestos-containing materials were found generally in the areas indicated. However, the work in this project is not intended to disturb the existing asbestos-containing materials. The asbestos survey/inspection report and the Asbestos Management Plan are available to the contractor(s) for demolition and for construction for his information.*
3. *An asbestos inspection was performed and asbestos-containing materials were found generally in the areas indicated. The asbestos survey/ inspection report is available to the contractor(s) for his information. The asbestos-containing materials shall be removed prior to any other work being performed in these areas. The Asbestos Management Plan is included in the documents. The asbestos abatement contractor shall mark up the Asbestos Management Plan to show the “As Built” conditions resulting from its work to include areas where asbestos was abated, areas where asbestos was encapsulated, and areas where asbestos containing materials exist but were left in place.*
4. *An asbestos inspection was performed and asbestos-containing materials were found generally in the area indicated. The asbestos survey/inspection report and the Asbestos Management Plan are available to the contractor(s) for demolition and for construction for his information. Asbestos-containing materials shall not be disturbed in this work except where specifically indicated and required for connections to utilities. Where such connections are required, the contractor shall have the obstructive and adjacent asbestos-containing materials removed by a licensed asbestos contractor using approved procedures as specified. The asbestos-containing materials that are to remain and the new non asbestos-containing material shall be labeled accordingly. The asbestos abatement contractor shall mark up the Asbestos Management Plan to show the “As Built” conditions resulting from its work to include areas where asbestos was abated, areas where asbestos was encapsulated, and areas where asbestos containing materials exist but were left in place.*

703.3 Asbestos Removal: All ACM that will be disturbed as a result of a renovation, demolition, or addition work must be removed. The Owner shall have asbestos project specifications written by a Virginia licensed designer. The designer’s license number, name and signature shall appear at the beginning of the asbestos specifications.

The asbestos project specifications shall adhere to all current federal and state regulations and policies.

The specifications shall include a copy of the project specific asbestos inspection report and Asbestos Management Plan indicating the sampling of and analyses for all materials that will or may be disturbed or accessed by the project. The specifications shall include a section that

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covers project notification by the asbestos contractor to the United States EPA, Virginia OSHA, and Division of Air Pollution Control at least 20 calendar days prior to the actual start of the asbestos project.

703.4 Asbestos Documents: Project drawings and specifications shall be submitted to the Bureau of Capital Outlay Management with the Working Drawings submittal for all projects if abatement is to be performed.

703.5 Asbestos Contracting: The Agency has two contracting options for use in removal of asbestos from a structure although option (2) is the preferred method:

1. A separate contract for removal of the asbestos prior to renovation, demolition or addition.
2. A contract where the abatement is an integral part of the renovation, addition or demolition project in which the general contractor is licensed as an asbestos contractor or hires a licensed asbestos abatement subcontractor to perform the work.

703.6 Asbestos Abatement Contractor: The Asbestos Abatement Contractor shall be required to mark up the Asbestos Management plan to show the As Built conditions resulting from its work to include areas where asbestos was abated, areas where asbestos was encapsulated, and areas where asbestos containing materials exist but were left in place.

703.7 Removal and Replacement of Sprayed-on Fireproofing: The A/E shall contact the State Fire Marshal early in the design phase to verify the original purpose of the fireproofing material to be removed or replaced and what, if anything, must be done to restore the fire resistive characteristics. Plans and specifications shall be submitted to the Fire Marshal which will include any bidding documents, addenda or change orders which may relate to the fire resistive characteristics of the structure. On a submittal to the Fire Marshal, indicate the construction date, original and present uses, height in floors and feet, whether sprinkled and any other information that may assist the Fire Marshal in his determination. If sprayed-on ACM is to be replaced, the Agency or its A/E shall also submit copies of the specifications for the intended replacement material and the bridging encapsulant specified by the asbestos project designer for review. The bridging encapsulant must be correctly matched with the replacement material to ensure maximum bonding strength and intended fire rating integrity of the assembly and acceptable flame spread ratings.

703.8 Use of Asbestos or Asbestos Containing Materials: The use of materials which contain asbestos shall be prohibited in any new construction or renovations.

703.9 Asbestos Related Work - Insurance Requirements: Asbestos inspectors, project designers and project monitors and their firms are required to provide evidence of professional liability/errors and omissions insurance, with asbestos coverage, in an amount not less than \$1,000,000.00. The Commonwealth of Virginia, its officers, employees, agents or any other person acting in an official capacity, temporarily or permanently, in the service of the Commonwealth, should also be named as additional insured persons.

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Section 11 (e) of the Commonwealth of Virginia *General Conditions of the Construction Contract* requires the asbestos Contractor or Subcontractor, as the case may be, to name the A/E as an additional insured on the Contractor's liability insurance with asbestos coverage. Where the A/E for the renovation project is also a Virginia licensed asbestos designer and prepares the asbestos project drawings and specifications, the requirement of Section 11 (e) to name the A/E as an insured party is waived. The A/E will include such waiver in a supplemental general condition to the project General Conditions.

703.10 Conflict of Interest Policies: The asbestos surveyor / inspector, the asbestos abatement designer, the Owners asbestos management plan author and any other person or firm hired by the Owner to provide consulting or inspection services on the project shall not be associated by any business or financial relationship to the asbestos abatement contractor.

Asbestos abatement contractors are not eligible to bid on those particular projects for which the asbestos surveys, inspections, bulk sample analyses, project designs, or asbestos management plans were performed by individuals or firms employed by or financially affiliated with the contractors during the time period in which the inspections were conducted, samples analyzed or the project designs written.

Asbestos surveyors, asbestos abatement designers or asbestos abatement management plan authors shall not contract with the asbestos abatement contractor to provide services on the project.

Asbestos project inspector (project monitors) are not eligible to contract for project inspection work on a project if they are financially affiliated with or employed by the asbestos abatement contractor on any project. These services are to be directly contracted for by the agencies, and the monitoring personnel shall be accountable only to Agency officials.

All laboratories utilized for asbestos sampling analyses for project purposes shall have no direct business or financial relationship with the contractors conducting asbestos abatement activities.

703.11 Asbestos Project Inspectors (Monitors): Each Agency shall ensure that asbestos abatement project specifications are followed by using a Virginia licensed project monitor to monitor the project and perform air quality testing throughout the duration and at final completion of the project. Further, on renovation and/or addition projects where Asbestos Containing Material (ACM) is left in place adjacent to the intended Work area, or is left in the Work area but is not anticipated to be disturbed by the Work, the agency shall use a Virginia licensed project monitor to monitor the renovation contractor's work to help avoid any disturbance of asbestos materials and potential contamination of the Work area or any other areas or systems.

703.12 Demolition / Renovation Notification Requirements: Any proposed demolition of a building which contains asbestos must be reported well in advance of any abatement activity to the United States EPA as required by CFR Title 40 Section 61.146-147, as amended, and to the State Air Pollution Control Board. The Environmental Protection Agency interprets these

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regulations to include non-friable materials which may be disturbed and rendered friable by the demolition (or renovation) activity. Questions about whether a particular project or product type is covered by these regulations may be directed to the Region 3 Asbestos Coordinator, United States EPA, 841 Chestnut Street, Philadelphia, Pennsylvania 19107; (215) 597-9859. Renovation projects require special attention because all buildings are suspected to contain some form of asbestos and because renovations usually require disturbance of existing surfaces. Renovation projects are subject to the same Environmental Protection Agency regulations as demolition projects with respect to notification and removal of asbestos. CFR Title 40 Sections 61.146-147.

- 703.13 Procurement of Asbestos Consulting Services:** Persons licensed by the Virginia Department of Professional and Occupational Regulation as asbestos inspectors, RFS inspectors, asbestos project monitors, asbestos project designers, asbestos management planners and asbestos analytical laboratories are considered as asbestos consultants and will be procured according to the guidelines established in Chapters 3 and 7 of the Agency Procurement and Surplus Property Manual.

Asbestos project designers provide services which may necessitate competitive negotiation where qualification factors as well as price should be used to determine the most suitable provider of the services.

A sample RFP for Asbestos Project Design Services is available from the Division of Purchases and Supply for use as a reference in drafting the procurement documents.

SECTION 704.0 SPECIAL PROCEDURES for LEAD BASED PAINT ABATEMENT

- 704.1 OSHA Regulations:** Effective June 3, 1993 the U. S. Department of Labors interim final rule amends the Federal OSHA standards for occupational health and environmental controls in subpart D of 29 CFR part 1926, adding a new Section 1926.62 indicating protection requirements for construction workers exposed to lead. The entire rule is contained in the *Federal Register* Vol. 58, No. 84, May 4, 1993. The Virginia OSHA regulations have subsequently adopted the federal regulations in total. The Virginia Department of Labor and Industry (DLI) established an emergency regulation in the May 27, 1996 *Virginia Register* requiring, among other things, that a permit be issued by DLI to the lead abatement contractor. This requirement is also stated in the General Conditions of the Construction Contract.
- 704.2 LBP Survey:** When planning a renovation, demolition or addition project, the agency shall have the facility to be renovated surveyed for lead based paint (LBP) contamination and document all quantities and locations found. Budget figures shall include the cost of Contractor compliance with the VOSHA requirements for abatement, containment and protection of construction workers for the specific project.
- 704.3 LBP Testing:** Agencies with multiple facilities with pending renovation projects should procure an indefinite delivery unit price contract with a qualified, licensed lead based paint

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testing firm to provide test reports as required for its facilities at the start of each planning process. This non-professional service procurement shall be in compliance with DPS procurement procedures.

704.3 LBP Removal: Where lead based paint is identified in areas to be renovated, the agency may choose to have all lead based paint abated or encapsulated prior to the start of construction or to have the work performed by the Contractor for the project.

704.4 LBP Disclosure: The construction drawings for renovation or addition projects shall indicate all locations where lead-based paint is to be disturbed or to remain and shall also have a lead-based paint disclosure statement indicating one of the following:

1. A lead-based paint inspection was performed and no lead-based paint was found.
2. A lead-based paint inspection was performed and lead-based paint was found in indicated areas. However, the work in this project is not intended to disturb existing lead-based paint.
3. A lead-based paint inspection was performed and lead-based paint was found in the areas indicated. The lead-based paint shall be removed prior to any other work being performed in these areas.
4. A lead-based paint inspection was performed and lead based paint was found in the areas indicated. Lead-based paint shall not be disturbed in this work except where specifically indicated and required for connections to utilities. Where such connections are required, Contractor shall have the obstructive and adjacent lead-based paint removed by a licensed lead- based paint abatement contractor using approved procedures as required by VOSHA. The lead-based paint that remains and new non lead-based paint areas shall be labeled accordingly.
5. A lead-based paint inspection was performed and lead-based paint was found in the areas indicated. The contractor shall be responsible for compliance with all requirements of the Virginia Occupational and Health Administration regulations regarding lead-based paint protection for workers.

704.5 LBP Encapsulation: If abatement and encapsulation is to be done by the General Contractor, the A&E shall identify the type and location of all lead-based paint and notify the contractor that this work is part of the contract for construction. Lead-based paint must be identified and the contractors notified that they must be in compliance with VOSHA requirements for worker safety. It shall be the contractor's responsibility to comply with the requirements of VOSHA.

704.7 Disposal Testing: Following removal of lead-based paint containing materials, additional TCLP tests in accordance with EPA guidelines shall be done on these materials to determine disposal requirements. TCLP tests of waste materials shall identify whether the material will be required to be disposed of as toxic waste or as ordinary construction debris. It shall be unlawful for materials identified as toxic waste to be disposed of with ordinary construction debris.

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SECTION 705.0 Underground Storage Tank Systems & Aboveground Storage Tanks

Technical standards related to USTS and AST are contained in the Department of Environmental Quality, Water Division Regulations: VR 680-13-02, *Underground Storage Tanks: Technical Standards and Corrective Action Requirements*; VR 680-14-12, *Facility and Aboveground Storage Tank Registration Requirements*; and VR 680-14-13, *Aboveground Storage Tank Pollution Prevention Requirements*.

- 705.1 Delegated Authority:** Pursuant to Section 36-98.1 of the *Code of Virginia*, the Director of the Department of General Services has delegated to local building departments inspection and enforcement authority for state-owned USTS and AST for the purpose of issuing permits, Certificates of Use and performing inspections required by VR 680-13-02; VR 680-14-12; and VR 680-14-13
- 705.2 Local Building Official Authority:** State agencies shall request the services above from the nearest local building department on all USTS and AST projects/actions. For capital outlay projects the agency will provide the local building department copies of the appropriate sections/sheets of the specifications/ drawings. The agency shall pay to the local building department the same fees as would be paid by a private citizen for the services rendered.

SECTION 706.0 CHESAPEAKE BAY PROGRAM

State agencies will ensure that their projects are located, designed and constructed to protect the water quality and living resources of the Chesapeake Bay. Adherence to *the Chesapeake Bay Watershed Development Policies and Guidelines* will be required in the development of all project sittings/designs. This publication is available from the Chesapeake Bay Local Assistance group within the Department of Conservation and Recreation, (804) 225-3440.

SECTION 707.0 EROSION AND SEDIMENT CONTROL REQUIREMENTS

- 707.1 Disturbance of land exceeding 10,000 square feet** (or lesser area if adopted by the Local Soil and Water Conservation District): Requires submission of an Erosion and Sediment Control Plan and narrative to the Department of Conservation and Recreation, Division of Erosion and Sediment Control for approval at the working drawings stage of plan development. Preparation and submission of the plan and narrative shall follow the requirements of the Virginia Erosion and Sediment Control Handbook, latest edition. The transmittal letter to the Division and the approval letter from the Division to the Agency shall be copied to the Bureau of Capital Outlay Management. Approval of the plan shall be secured prior to bid advertisement. Contact the regional or central Division office for clarification of the regulations. [*Erosion and Sediment Control Regulation* - VR 625-02-00]
- 707.2 Disturbance of land exceeding one acre:** Requires submission of a stormwater management plan with calculations to the Department of Conservation and Recreation, Division of Stormwater Management. This is not a substitute for the erosion and sediment control plan, but is an additional requirement to manage the runoff and quality of the stormwater collected on the site. The regional or central Division office should be contacted for information on the required calculations and submissions for approval of the stormwater management plan or clarification of

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regulations. Approval of the plan shall be secured prior to the bid advertisement. [*Stormwater Management Regulations* - VR 215-02-00]

707.3 Disturbance of land exceeding five acres: Requires a discharge permit issued by the Department of Environmental Quality. This is not a substitute for the erosion and sediment control plan or the stormwater management plan, but an additional requirement. Contact the Department for permit applications and clarification of the regulations. The permit shall be approved prior to bid advertisement.

707.4 Plans and Specifications: Requirements shall be included in the specifications to assign to the contractor (as part of the contract) the responsibility of erosion and sediment control and stormwater management at all sites (on or off the owner's property) of borrowing, wasting or stockpiling of soil products. A statement similar to the following shall be used:

The Contractor shall be responsible for satisfying any and all erosion control (EC) and stormwater management (SWM) requirements for any land disturbing activities, including but not limited to, on-site or offsite borrow, on-site or offsite stockpiling or disposal of waste materials. Before undertaking any land disturbing activity for which the plans do not specifically address erosion control and stormwater management, the Contractor shall contact the Regional Office of the Division of Soil and Water Conservation to determine what EC and SWM measures are necessary. The Contractor shall completely satisfy all requirements of the Division of Soil and Water Conservation including providing a designated, certified "Responsible Land Disturber" before continuing with the concerned activity.

SECTION 708.0 ENVIRONMENTAL IMPACT REPORT

Agency shall procure and submit an Environmental Impact Report for each major state project (Virginia Code §10.1-1188). Regulatory authority is assigned to the Virginia Department of Environmental Quality (Va DEQ) in Virginia Code §10.1-1191. A 'major state project' is defined as any project or real property acquisition which cost \$100,000 or more. Submission requirements are described in the "Procedure for Environmental Impact Review of Major State Facilities", prepared by the Virginia DEQ. An EIR may not be required by DEQ for some interior renovations and work covered by a previous EIR. However, the Agency must submit its request to DEQ citing the nature of the work and justification for excluding the project from the requirements for an EIR. DEQ will make a determination on the validity of the request and provide a written response on its findings.

The following are excerpts from the Code of Virginia:

§ 10.1-1188. State agencies to submit environmental impact reports on major projects.

A. All state agencies, boards, authorities and commissions or any branch of the state government shall prepare and submit an environmental impact report to the Department on each major state project.

"Major state project" means the acquisition of an interest in land for any state facility construction, or the construction of any facility or expansion of an existing facility which is hereafter undertaken

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by any state agency, board, commission, authority or any branch of state government, including state-supported institutions of higher learning, which costs \$100,000 or more. For the purposes of this chapter, authority shall not include any industrial development authority created pursuant to the provisions of Chapter 49 (§ [15.2-4900](#) et seq.) of Title 15.2 or Chapter 643, as amended, of the 1964 Acts of Assembly. Nor shall authority include any housing development or redevelopment authority established pursuant to state law. For the purposes of this chapter, branch of state government shall not include any county, city or town of the Commonwealth.

Such environmental impact report shall include, but not be limited to, the following:

- 1. The environmental impact of the major state project, including the impact on wildlife habitat;*
- 2. Any adverse environmental effects which cannot be avoided if the major state project is undertaken;*
- 3. Measures proposed to minimize the impact of the major state project;*
- 4. Any alternatives to the proposed construction; and*
- 5. Any irreversible environmental changes which would be involved in the major state project.*

For the purposes of subdivision 4 of this subsection, the report shall contain all alternatives considered and the reasons why the alternatives were rejected. If a report does not set forth alternatives, it shall state why alternatives were not considered.

§ 10.1-1190. Approval of Governor required for construction of facility.

The State Comptroller shall not authorize payments of funds from the state treasury for a major state project unless the request is accompanied by the written approval of the Governor after his consideration of the comments of the Department on the environmental impact of the facility. This section shall not apply to funds appropriated by the General Assembly prior to June 1, 1973, or any reappropriation of such funds.

§ 10.1-1191. Development of procedures, etc., for administration of chapter.

The Department shall, in conjunction with other state agencies, coordinate the development of objectives, criteria and procedures to ensure the orderly preparation and evaluation of environmental impact reports required by this article. These procedures shall provide for submission of impact statements in sufficient time to permit any modification of the major state project which may be necessitated because of environmental impact.

SECTION 709.0 Reserved

SECTION 710.0 Reserved

SECTION 711.0 Reserved

SECTION 712.0 Reserved

SECTION 713.0 Reserved

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SECTION 714.0 **Reserved**

SECTION 715.0 **Reserved**

SECTION 716.0 **Reserved**

SECTION 717.0 DEB ROOFING STANDARDS FOR STATE BUILDINGS

The Appropriations Act requires all agencies to give first priority to the roofs of its facilities. Assuming roofs are equal in other respects steep roofs are more desirable than low-slope roofs. Economy, aesthetics, constructability and compatibility are valid considerations in evaluation and design of roof systems.

717.1 Roofing Abbreviations

BUR: Built-up Roofing

CSPE: Chlorosulfonated Polyethylene

EPDM: Ethylene Propylene Diene Monomer

FM: Factory Mutual

NDE: Non-Destructive Evaluation

NRCA: National Roofing Contractors Association

NRCA Manual: The NRCA Roofing and Waterproofing Manual (latest edition)

RCI: Roof Consultants Institute

RIEI: Roofing Industry Educational Institute

SPM: Single-ply Membrane

SPRI: Single-ply Roofing Institute

UL: Underwriters Laboratories

717.2 Acceptable Roofing

717.2.1 Low Slope Roofing Membranes: The following types of membrane are acceptable on low-slope roofs for state-owned facilities:

1. EPDM, Single-ply, 45 mil minimum thickness; 60 mil preferred.
2. Reinforced CSPE, Single-ply, 45 mil minimum thickness.
3. Built-up Roofing, Hot Bitumen, 4-ply minimum.
4. Hybrid 4 ply system with reinforced Modified Bitumen cap sheet

717.2.2 Metal Roofing: The following types of metal roofs are acceptable on state-owned facilities:

1. Double lock seam or flat seam terne metal roofs which comply with SMACNA Architectural Sheet Metal Manual or the NCRA Metal Roofing Manual are acceptable.
2. Lapped rib panels with exposed fasteners are acceptable only for utility structures such as sheds, or where part of a pre-engineered building where manufacturer is responsible for water tightness.
3. Architectural systems installed over a solid deck are acceptable only for slopes 4:12 or greater, if they use clip-on caps or single lock ribs.

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4. Structural systems, which can span between widely spaced purlins, may be used for low-slope roofs, and must have machine-locked ribs a minimum of 2" high, with tape or gaskets between ribs.

If panels are longer than 10', details and specifications must show where system is anchored (ridge, center, or eave) and how expansion is accommodated. Gaskets or tape shall be used to make seams watertight. Use closures at ends of ribbed panels.

717.3 Other Roofing Membranes: The Director of the DEB will consider the use of membranes other than EPDM, CSPE, and BUR only if the Owner requests and the A/E supports, in writing, the use of the alternative system. The request must be received and approved before working drawings are submitted for review and shall provide the following:

1. The reasons for using other membrane(s).
2. A description of the system(s) and membrane(s).
3. A summary of evaluated design criteria listed in Section 707B.11.
4. The A/E shall confirm in writing:
 - a. That the roofing membranes and systems have been investigated and in the A/E's opinion are suitable for use on the proposed project roof(s)
 - b. That at least three installations have had at least five years of successful service in Virginia or contiguous states - provide project names and Owner, approximate roof sizes, locations, contact names and telephone numbers
 - c. That the A/E has personally investigated at least three installations of the proposed system(s) and is satisfied that they will have a service life of ten or more years under normal conditions.

Requests that do not provide the foregoing information will be returned without action.

717.4 Reroofing: Before reroofing a facility or making major repairs, the Owner must procure a roof survey performed by an experienced and qualified inspection service. The roof survey shall use infrared or nuclear NDE moisture detection methods. For roofs repairs or replacement, an asbestos survey shall be performed and the findings reported in writing.

Exception: For roofs that are very small or that have reached an advanced stage of deterioration and where a roof survey does not appear cost effective, an Agency may, after determining the conditions by visual inspection, request a waiver of the roof condition survey. The request must be accompanied by a roof plan sketch with features noted, a written description of the problems cross referenced to the plan, an approximate area of the roof, and photographs showing the conditions which support the request. An asbestos assessment is required.

If complete reroofing is required:

1. Provide secondary (emergency) roof drains in accord with the requirements for new construction.
2. Provide guarantees for new construction

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3. If insulation in the roof covering assembly provides required thermal resistance for the building, then provide insulation in the roof covering assembly in accord with the requirements for new construction.

717.4 Owner's Roofing Inspection: The Owner shall have a full-time inspector on the job while the roof is being applied. The inspector can be the project inspector or someone qualified to inspect a roof installation but, preferably, a RIEI Certified Quality Assurance Observer, RCI Registered Roof Observer or one who has attended Roof Consultants Institute Seminars. Before selecting an inspector, the Owner shall discuss the inspector qualifications with BCOM and the A/E.

The Roofing Inspector shall check all materials and application procedures and prepare a daily written report covering such items as: the weather conditions, the deck conditions, the materials stored, the materials installed, and the installation procedures used including bitumen temperature at kettle and point of applications, etc. A copy of the daily report shall be given to the Contractor. The inspector shall not permit installation of roofing materials without having first obtained from the Design Architect a copy of the manufacturer's certification confirming that the materials delivered for use on the project meet the specified ASTM Standards or other approved Standards. The Owner shall inspect the roof(s) semi-annually, as a condition of the roofing guarantee and states maintenance policy. The Owner shall also inspect the roof(s) before the two-year guarantee expires. See Appendix G.

717.5 Pre-roofing Conference: A conference shall be held before ordering roofing materials.

1. Representatives of the Owner (including the Roofing Inspector), Architect, General Contractor, Roofing Contractor, Deck Contractor, Mechanical Contractor, and Roofing Manufacturer will attend.
2. Review plans, specifications, flashing details, work scheduling, and workmanship standards required. Resolve problems and discrepancies.
3. Prepare a written record of proceedings and make it a part of the job record.

717.6 Guarantee: Specify guarantees and warranties for new construction or reroofing in the Special Conditions or General Requirements.

Provide the following Roofing contractors guarantee on the General Contractor Guarantee:

The roofing contractor shall guarantee its materials and workmanship associated with the roofing, flashings, and sheet metal work incidental to the work required under the roofing subcontract, against defect due to faulty materials or workmanship for a period of two (2) years from the date of completion of such work. It is understood and agreed by all parties hereto that the responsibility of the roofing contractor under this guarantee form or any contract document shall be limited to the limited guarantee herein expressed by said roofing contractor.

Provide the following Owners Agreement on the Contractor Guarantee:

The undersigned named Owner for the Commonwealth agrees, from the date of acceptance of the project, to maintain the roof in accordance with the manufacturers

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written requirements and agrees to avoid damage to the roof surface by any parties under his control working or walking on the roof. The Owner recognizes his responsibility to inspect the roof semi-annually.

717.6.1 New Construction: The (General) Contractor shall furnish as a minimum, a manufacturers standard 10-year warranty/ guarantee in which he agrees to maintain the entire roof system(s) in a completely watertight condition at no cost to the Owner for two (2) years from date of final acceptance; except the water tightness guarantee shall not be enforced when the Contractor can prove water damage was caused by the Owner. Authorized agents of the General Contractor, Roofing Contractor, and Owner shall execute the guarantee form.

717.6.2 Reroofing: The (General) Contractor shall furnish as a minimum, a manufacturers standard 10-year warranty/ guarantee for the materials and workmanship associated with the roofing, flashings, and sheet metal work incidental to the reroofing project against defects due to faulty materials or workmanship for a period of two (2) years from the date of completion.

SECTION 718.0 WATERPROOFING and DRAINAGE for SUBSURFACE STRUCTURES

No state buildings for human or equipment occupancy shall be designed with basement floor levels below the water table.

SECTION 719.0 Reserved

SECTION 720.0 FIRE PROTECTION INFORMATION

This section defines the requirements and methodology for the development of the Fire Protection Information Plan. See Chapter 9 of this Manual for issues not related to code compliance.

720.1 Responsibilities: The A/E shall provide complete project specific drawings and specifications that result in code compliant Construction.

720.2 Existing Buildings – Compliance Alternatives: Where change of occupancy is intended for an existing building, full compliance with VUSBC or VUSBC Compliance Alternatives is required.

720.3 Drawings: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Tabulation of floor areas (new and renovated), total area, volume.
2. Tabulation of units: Number of auditorium seats, bedrooms etc.
3. Listing of applicable codes with dates.
4. Building Purpose and Occupancy.
5. Use Group(s) per VUSBC.
6. Indicate whether the building is designated as an “Emergency Shelter”.
7. Type of construction and VUSBC Type #
8. Design Occupancy Load(s) per VUSBC.
9. Indicate the Seismic Design Category
10. Define each Group area and show its VUSBC Group classification

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(A-1, A-2, etc.).

11. Identify and show rating of all rated assemblies, smoke barriers.
12. Indicate use(s) of all building spaces (offices, auditoriums, etc.) or reference drawings where complete information may be found.
13. Show the VUSBC number of occupants to be accommodated in each space. (This number should be the same as the posted maximum for the space.)
14. Distinguish new walls from existing walls and new construction from existing construction. Completely show routes of all fire walls, fire separation walls (including exit access corridor walls), and smoke partitions.
15. Identify the extent of all fire-rated floor/ceiling and roof/ceiling assemblies.
16. With reference symbols, identify each new and existing, if known or available, fire resistance rated Structure Element and change in element design (including wall, floor, ceiling, and other vertical or horizontal elements).
17. Show locations of all portable fire extinguisher cabinets.
18. Provide drawings including typical and special details that clearly define the locations and extents of the application of Sprayed-on Fireproofing.
19. Define the UL Design Assemblies specific to the respective locations and application of the Sprayed-on Fireproofing.

720.4 Calculations: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide calculations that demonstrate and support the Type of Construction indicated for the project based on Use Group, Allowable Height and Allowable Area.
2. Provide calculations to support the indicated Design Occupant Load on a space by space and floor by floor basis.
3. Provide calculations to demonstrate and support the indicated capacity of the Egress Components through out the building.

SECTION 721.0 FIRE DETECTION & ALARM SYSTEMS

This section defines the requirements and methodology for the development of Fire Alarm System design. See Section 701.0 Building Code & Application of Requirements for Shop Drawings review procedures. See Chapter 9 of this Manual for issues not related to code compliance.

721.1 Responsibilities: The A/E shall provide complete project specific drawings and specifications that define a code compliant Fire Alarm System. User's Programmatic Requirements which may supplement or provide additional levels of protection above the minimum requirements of the code shall be included in the design. Changes to the design during the Construction Phase of the project shall be considered Substitutions in accord with the General Conditions. Changes shall be documented by Change Order and shall be submitted to the Building Official for review. The A/E shall assure that code compliant Fire Alarm Systems(s) are provided through the review of the Fire Alarm Shop Drawings and the observation of the progress and quality of the work. The A/E shall confirm that the Fire Alarm System(s) is complete and code compliant.

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721.2 Working Drawing Submission: It is the responsibility of the A/E to provide a project specific design. Performance criteria do not meet the intent of this section.

721.2.1 Drawings: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Locate and identify all Fire Alarm System alarm-initiating and notification appliances.
2. Locate and identify where protective covers are utilized with Fire Alarm System alarm-initiating and notification appliances.
3. Locate and identify all Fire Alarm control and trouble signaling equipment.
4. Locate and identify all Existing Alarm System alarm-initiating and notification appliances.
5. Locate and identify all Existing Fire Alarm control and trouble signaling equipment.
6. Locate and identify the interface requirements for all Fire Alarm System alarm initiating devices provided by other trades such as HVAC Duct Smoke Detectors, Kitchen Hood Fire Suppression Systems, Fire Sprinkler Flow and Tamper Switches.
7. Locate and identify the interface requirements for all devices whose operation is initiated by the Fire Alarm System such as Door Hold Open Devices, Fire Shutters, Elevator Recall, Electronic Door Hardware, and Smoke Control Systems.
8. Identify the Primary and Secondary Power Supplies and Connections.
9. Identify the Candela output levels for all visual alarm notification appliances. Candela ratings such as “15/75” are not compliant.
10. Provide a matrix that defines the interface of the Fire Safety Control Functions. Define the action that will initiate an alarm or trouble condition. Define the alarm-initiating device activated, the action of the control and trouble signaling equipment, and the resulting alarm notification appliance actions and resulting operation of interfaced equipment.
11. Provide Fire Alarm System Riser Diagram showing all system components. Define the “Zones” to be protected. Diagrammatically define the location of the constantly attended location from which the Fire Alarm System will be supervised. Define the interface between the Fire Alarm System and the constantly attended location

721.2.2 Specifications: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide wording in the Specifications that indicate that the location and type of Fire Alarm System alarm-initiating appliances, and the type of Fire Alarm System alarm notification appliances and control and trouble signaling equipment, the location of major components are not to be altered by the Contractor, without prior written approval by the A/E and the Building Official. Changes to the design depicted within the Construction Documents shall be considered Substitutions in accord with the General Conditions and are to be documented by Change Order.
2. Provide a description of the Acceptance Testing Requirements. Indicate which of the Acceptance Tests are to be witnessed by the Regional Office of the State Fire Marshal.

721.2.3 Calculations: Provide the following minimum to demonstrate compliance with the requirements of the code:

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1. Demonstrate that the quantity and location of the Audible Alarms as indicated on the drawings attain the code defined Sound Pressure Levels in each of the respective spaces.
2. Demonstrate that the required capacity of the Secondary Power supply is attained.
3. Demonstrate that the indicated Candela performance is attained for Alarm Notification Devices where Protective Covers are utilized

721.3 Shop Drawings Review: Shop Drawings (Working Plans, Product Data and Calculations) are to be reviewed by the A/E of Record for compliance to the Project Contract Documents and the code. At the conclusion of the Shop Drawing review, the A/E of Record shall:

1. Verify the Underwriters Laboratories (UL) Listings and Classifications for the materials, components, and equipment provided for this project result in a code compliant Fire Alarm System.
2. Provide a “Sealed” Statement, attached to the reviewed Shop Drawings indicating that the Fire Alarm Shop Drawings (Working Plans, Product Data and Calculations) satisfy the requirements of the Project Contract Documents and the code (cite the applicable NFPA).
3. Provide the Regional Office of the State Fire Marshal copy(s) of the approved complete Fire Alarm Shop Drawings.
4. Provide DEB/BCOM a copy of the “Sealed” Statement and a copy of the transmittal to the Regional Office of the State Fire Marshal.

721.4 Validation of the Fire Alarm Systems: Fire Alarm Systems are to be Acceptance Tested in accord with the requirements of the code. The Regional Fire Marshal’s Office shall observe the installed Fire Alarm System and witness the Fire Alarm System Performance Tests. The A/E and Contractor shall certify that the Fire Alarm System is complete.

SECTION 722.0 FIRE SUPPRESSION SYSTEMS - SPRINKLERS

This section defines the requirements and methodology for the development of Fire Suppression System design. See Section 701.0 Building Code & Application of Requirements for Shop Drawings review procedures. See Chapter 9 of this Manual for issues not related to code compliance.

722.1 Responsibilities: The A/E shall provide complete project specific drawings and specifications that define a code compliant Fire Sprinkler System. User’s Programmatic Requirements which may supplement or provide additional levels of protection above the minimum requirements of the code shall be included in the design. Changes to the design during the Construction Phase of the project shall be considered Substitutions in accord with the General Conditions. Changes shall be documented by Change Order and shall be submitted to the Building Official for review. The A/E shall assure that code compliant Fire Suppression Systems(s) are provided through the review of the Fire Suppression Shop Drawings and the observation of the progress and quality of the work. The A/E shall confirm that the Fire Suppression System(s) is complete and code compliant.

722.2 Working Drawing Submission: It is the responsibility of the A/E to provide a project specific design. Performance criteria do not meet the intent of this section.

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722.2.1 Drawings: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Identify the Occupancy Hazard Classification and show the location of sprinklers for each of the spaces on each floor within the buildings. The location of Sprinklers are to be based on the VUSBC, NFPA 13 and the User's Programmatic Requirements with the understanding that the quantity, coverage, location and type of sprinkler are not to be altered by the Contractor, without prior written approval by the A/E and the Building Official. The resulting changes are to be documented by Change Order.
2. Show the location of Fire Department Valves and Risers within the building. Indicate that the Fire Department Valves are attached to either a Standpipe Riser, Combined Standpipe and Sprinkler Riser, or Wet Pipe Sprinkler System Risers. The locations of Fire Department Valves are to be based on the VUSBC, NFPA 13, NFPA 14 and the User's Programmatic Requirements.
3. Show proposed sprinkler piping and standpipe layout including the sprinkler mains (including cross mains) within the building and layout of branch lines for the most hydraulically demanding zone(s) on each floor of each Sprinkler System. Indicate the size of pipes that are shown.
4. Provide a table summarizing the characteristics of each of the Sprinkler Systems. Define the type of Sprinkler System(s), Areas of Coverage, Hazard, Minimum rate of water coverage (Density) per Area, Water required for each Area of Coverage, Hose Stream Allowances for each area, Total Water Requirements for each area of coverage, Hydraulically Calculated Pressure requirements at a common reference point at design flow for each area of coverage, and Water Supply (Flow & Pressure) available at the common reference point. See attached Table 1, Fire Sprinkler System Summary.
5. Provide a small scale drawing showing locations of water hydrants, test and flow hydrants (for waterflow tests), and routing of underground pipe. Indicate the Waterflow Test results, the date and time taken and who conducted the test. Indicate the Water Supply (Flow & Pressure) at a reference point common with the Sprinkler /Standpipe System Design.
6. Show and identify all existing Sprinkler Systems and Standpipe Systems.
7. Show and indicate all new connections to existing systems.
8. Provide sprinkler riser diagram with appropriate fittings, accessories, sizes, alarms, valves, etc., noted.
9. Show all System Drains
10. Show all Inspector's Test Station locations and associated discharge/ drainage piping.
11. Show the location of the Fire Department Connection(s) with all interconnecting piping to the Sprinkler and Standpipe Systems.
12. Show the location and details of the Fire Pump, Driver, Fire Pump Controller, piping, components and piping specialties.
13. Show the location of the Fire Pump Test Header and all interconnecting piping.
14. Show Sprinkler head type, K-factor and temperature ratings

722.2.2 Specifications: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide complete Specifications to reflect the Systems that are defined on the Drawings.

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2. Provide wording in the Specifications that indicate that the type of systems, the location of major components, the quantity, type, coverage, location of sprinklers, and modifications to the distribution system are not to be altered by the Contractor, without prior written approval by the A/E and the Building Official. Changes to the design depicted within the Construction Documents shall be considered Substitutions in accord with the General Conditions and are to be documented by Change Order.
3. Provide a description of the Acceptance Testing Requirements. Indicate which of the Acceptance Tests are to be witnessed by the Regional Office of the State Fire Marshal.

722.2.3 Calculations: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide final Hydraulic Calculations for each of the Sprinkler Systems and the Standpipe System.
2. The Calculations shall demonstrate the performance of the system with an Automatic Water Supply for the most hydraulically demanding Zone on each floor of the building for each of the Fire Sprinkler Systems Compliant with NFPA 13 and NFPA 14.
3. The Calculations shall also demonstrate the performance of the Sprinkler and Standpipe Systems as connected to the Manual Water Supply (Fire Department Pumper Truck – validate Pumper Truck performance with Local Fire Department) by the Fire Department Connection and interconnecting piping Compliant with the VUSBC, NFPA 13 & NFPA 14.

722.3 Shop Drawings Review: Shop Drawings (Working Plans, Product Data and Calculations) are to be reviewed by the A/E of Record for compliance to the Project Contract Documents and the code. At the conclusion of the Shop Drawing review, the A/E of Record shall:

1. Verify the Underwriters Laboratories (UL) Listings and Classifications for the materials, components, and equipment provided for this project result in a code compliant Fire Suppression System.
2. Provide a “Sealed” Statement, attached to the reviewed Shop Drawings indicating that the Fire Suppression Shop Drawings (Working Plans, Product Data and Calculations) satisfy the requirements of the Project Contract Documents and the code (cite the applicable NFPA Sections).
3. Provide the Regional Office of the State Fire Marshal copy(s) of the approved complete Fire Suppression Shop Drawings.
4. Provide DEB/BCOM a copy of the “Sealed” Statement and a copy of the transmittal to the Regional Office of the State Fire Marshal.

722.4 Validation of the Fire Suppression Systems: Fire Suppression Systems are to be Acceptance Tested in accord with the requirements of the code. The Regional Fire Marshal’s Office shall observe the installed Fire Suppression System and witness the Fire Suppression System Performance Tests. The A/E and Contractor shall certify that the Fire Suppression System is complete.

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SECTION 723.0 FIRE SUPPRESSION SYSTEMS - CLEAN AGENTS

This section defines the requirements and methodology for the development of Fire Suppression Systems, other than NFPA 13 and/or NFPA 14 water based systems, compliant with the VUSBC. See Section 701.0 Building Code & Application of Requirements for Shop Drawings review procedures. See Chapter 9 of this Manual for issues not related to code compliance.

723.1 Responsibilities: The A/E shall provide complete project specific drawings and specifications that define code compliant Fire Suppression Systems. User's Programmatic Requirements which may supplement or provide additional levels of protection above the minimum requirements of the code shall be included in the design. Changes to the design during the Construction Phase of the project shall be considered Substitutions in accord with the General Conditions. Changes shall be documented by Change Order and shall be submitted to the Building Official for review. The A/E shall assure that code compliant Fire Suppression Systems(s) are provided through the review of the Fire Suppression Shop Drawings and the observation of the progress and quality of the work. The A/E shall confirm that the Fire Suppression System(s) is complete and code compliant.

723.2 Halon: Halon 1211, 1301, and 2402 shall not be used in the design of new fire extinguishing systems in state-owned buildings.

723.3 Working Drawing Submission: It is the responsibility of the A/E to provide a project specific design. Performance criteria do not meet the intent of this section.

723.3.1 Drawings: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Show and identify rooms/spaces to be protected by the proposed Fire Suppression System.
2. Show the enclosure partitions (full and partial height) of the protected area.
3. Identify the locations of the major Fire Suppression System Components.
4. Show the routing of the Fire Suppression System lines between the stored agent and the dispersion nozzles within each of the protected spaces. Indicate sizes of pipes that are shown.
5. Provide a table defining the type of Fire Suppression System(s), Areas of Coverage, Hazard, Minimum required Concentration of Fire Suppression Agent, Volume of Agent required for each Area of Coverage, Total Volume of agent for the areas protected by this system.
6. Show and identify all Existing Fire Suppression Systems.
7. Show the location of all dispersion nozzles for all spaces/areas protected.
8. Show the locations and components of the Automatic Detection System and Agent Releasing System.
9. Show the location of and define the interface requirements to connect to the building's Fire Alarm System.
10. Show the location of components for means of manually releasing of agent.
11. Location of controlled devices such as dampers and shutters

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12. Provide Fire Suppression System riser diagram with appropriate fittings, fire suppression agent storage tanks, accessories, sizes, alarms, valves, etc...
13. Show and indicate all new connections to existing systems.
14. Show the location of instructional signage.

723.3.2 Specifications: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide complete Specifications to reflect the Systems that are defined on the Drawings.
2. Provide wording in the Specifications that indicate that the type of system, concentration requirements, quantity of agent required, location and type of dispersion nozzles, location of major components and modifications to the distribution system are not to be altered by the Contractor, without prior written approval by the A/E and the Building Official. Changes to the design depicted within the Construction Documents shall be considered Substitutions in accord with the General Conditions and are to be documented by Change Order.
3. Provide complete step-by-step description of the system sequence of operations including functioning of abort and maintenance switches, delay timers, and emergency power shutdown.
4. Provide a description of the Acceptance Testing Requirements. Indicate which of the Acceptance Tests are to be witnessed by the Regional Office of the State Fire Marshal.

723.3.3 Calculations: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Complete calculations to determine enclosure volume and quantity of agent required.
2. Calculations to define the size of backup batteries
3. The method used to determine number and location of audible and visual indicating devices.
4. The method used to determine number and location of detectors.

723.4 Shop Drawings Review: Shop Drawings (Working Plans, Product Data and Calculations) are to be reviewed by the A/E of Record for compliance to the Project Contract Documents and the code. At the conclusion of the Shop Drawing review, the A/E of Record shall:

1. Verify the Underwriters Laboratories (UL) Listings and Classifications for the materials, components, and equipment provided for this project result in a code compliant Fire Suppression System.
2. Provide a “Sealed” Statement, attached to the reviewed Shop Drawings indicating that the Fire Suppression Shop Drawings (Working Plans, Product Data and Calculations) satisfy the requirements of the Project Contract Documents and the code (cite the applicable NFPA Sections).
3. Provide the Regional Office of the State Fire Marshal copy(s) of the approved complete Fire Suppression Shop Drawings.
4. Provide DEB/BCOM a copy of the “Sealed” Statement and a copy of the transmittal to the Regional Office of the State Fire Marshal.

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723.5 Validation of the Fire Suppression Systems: Fire Suppression Systems are to be Acceptance Tested in accord with the requirements of the code. The Regional Fire Marshal's Office shall observe the installed Fire Suppression System and witness the Fire Suppression System Performance Tests. The A/E and Contractor shall certify that the Fire Suppression System is complete.

SECTION 724.0 SPRAYED-ON FIREPROOFING DESIGN & SPECIFICATION

This section defines the requirements and methodology for the development of Sprayed-on Fireproofing Design & Specification. See Section 701.0 Building Code & Application of Requirements for Shop Drawings review procedures. See Chapter 9 of this Manual for issues not related to code compliance.

724.1 Responsibilities: The A/E shall provide complete project specific drawings and specifications that result in code compliant Fire Resistive Construction through the use of Sprayed-on Fireproofing. The A/E shall determine which members are required to be fireproofed and indicate the minimum thickness of the sprayed-on fireproofing to be applied. Changes to the design during the Construction Phase of the project shall be considered Substitutions in accord with the General Conditions. Changes shall be documented by Change Order and shall be submitted to the Building Official for review. The A/E shall assure that code compliant Fire Resistive Construction is provided through the review of the Sprayed-on Fireproofing Shop Drawings and the observation of the progress and quality of the work. The A/E shall confirm that the Fire Resistive Construction is complete and code compliant.

724.2 Removal and Replacement of Sprayed-on Material: Agencies and/or their A/E shall contact the Building Official early in the design phase to verify the original purpose of the fireproofing material to be removed or replaced and what, if anything, must be done to restore the fire resistive characteristics.

Submit Plans and specifications to the Building Official which will include any bidding documents, addenda or change orders which may relate to the fire resistive characteristics of the existing structure. Include the date(s) of construction, original and present uses, height in floors and feet, whether sprinkled and any other information that may assist the Building Official in his determination.

724.3 Working Drawing Submission: It is the responsibility of the A/E to provide a project specific design. Performance criteria do not meet the intent of this section.

724.3.1 Drawings: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide drawings including typical and special details that clearly define the locations and extents of the application of Sprayed-on Fireproofing.
2. Define the UL Design Assemblies specific to the respective locations and application of the Sprayed-on Fireproofing.

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724.3.2 Specifications: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide complete Specifications to reflect the Sprayed-On Fireproofing Assemblies that are defined on the Drawings.
2. The Specifications shall clearly state that no asbestos-containing material will be allowed to be used. Contractor shall be required to certify that the material being used contains no asbestos particles.
3. Where structural steel members having different thicknesses of sprayed-on fireproofing intersect or connect, provide sprayed-on fireproofing equal to the greater thickness on all members for a distance of two (2) feet minimum from the junction of the members.
4. Metal attachments such as miscellaneous angles, light gage framing, and hangers shall be covered in the areas of the attachment with the same thickness of sprayed-on fireproofing as the structural member.
5. All sprayed-on fireproofing shall be tested after installation according to ASTM E-605 and ASTM E-736, latest editions. Include the specific Validation Testing Requirements as defined in CPSM Section 724.4.1. These tests shall be made by an independent testing laboratory. The Owner shall arrange and pay for laboratory services for field and laboratory tests and reports. The Contractor shall schedule the tests while the material is accessible. If additional tests are required as a result of non-compliance with the specifications; the additional tests and reports shall be paid for by the Contractor.
6. The independent testing laboratory reports shall clearly show the location of the tests and test results. Copies of the reports shall be sent through the A/E to the Owner, State Fire Marshal and Bureau of Capital Outlay Management.

724.4 Shop Drawings Review: Shop Drawings (Working Plans, Product Data and Calculations) are to be reviewed by the A/E of Record for compliance to the Project Contract Documents and the code. At the conclusion of the Shop Drawing review, the A/E of Record shall:

1. Verify the Underwriters Laboratories (UL) Design Assemblies and for the materials, and components provided for this project result in a code compliant Fire Resistive Construction.
2. Provide a “Sealed” Statement, attached to the reviewed Shop Drawings indicating that the Sprayed-on Fireproofing Shop Drawings (Working Plans, Product Data and Calculations) satisfy the requirements of the Project Contract Documents and the Code.
3. Provide the Regional Office of the State Fire Marshal copy(s) of the approved complete Shop Drawings.
4. Provide DEB/BCOM a copy of the “Sealed” Statement and a copy of the transmittal to the Regional Office of the State Fire Marshal.

724.5 Validation of the Sprayed-on Fireproofing Assemblies: Sprayed-on Fireproofing Assemblies are to be Acceptance Tested in accord with the requirements of the code and the requirements defined herein. The Regional Fire Marshal’s Office shall observe the installed Sprayed-on Fireproofing Assemblies. The independent testing laboratory reports shall clearly show the location of the tests and test results. The A/E and Contractor shall certify that the Sprayed-on Fireproofing Assemblies are complete. Copies of the reports shall be

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sent through the A/E to the Owner, State Fire Marshal and Bureau of Capital Outlay Management.

- 724.5.1 Validation Testing Requirements:** All sprayed-on fireproofing shall be tested after installation according to ASTM E-605 and ASTM E-736, latest editions. The location and number of tests of the sprayed-on fireproofing shall conform to the requirements below:
1. For Thickness on Floor Sections: One out of every four bays or similar units shall be inspected, but in no case shall a bay or unit exceed 2,500 sq. ft. Each bay or unit selected shall be divided into quarters. In each quarter, a 12-inch square shall be selected for taking thickness measurements. The thickness shall be determined by taking the average of at least ten individual symmetrical thickness measurements within the 12 inch square. Where more than one thickness is required by design, a similar procedure shall be followed for each of the required thicknesses.
 2. For Thickness on Beams and Columns: Beam and column thickness measurements shall be taken within each bay or similar unit in which floor insulation thickness measurements are made. Four sets of random measurements shall be taken for each bay or unit.
 3. For Density: Samples for density determination shall be taken for each 10,000 sq. ft. of pre-selected floor area, but in no case shall there be less than two per floor.
 4. For Bond Strength: Samples for cohesion / adhesion shall be taken on thoroughly dried material adjoining test sections used for thickness and density determinations. There shall be one test for beams and one test for decks for each 10,000 sq. ft. of pre-selected floor area, but in no case shall there be less than two tests per floor.

SECTION 725.0 FIRE & SMOKE DAMPERS

725.1 Responsibilities: The A/E shall provide complete project specific drawings and specifications that locate, identify and define a code compliant Fire and Smoke Dampers. Changes to the design during the Construction Phase of the project shall be considered Substitutions in accord with the General Conditions. Changes shall be documented by Change Order and shall be submitted to the Building Official for review. The A/E shall confirm that the Fire and Smoke Dampers are complete, functional and code compliant.

725.2 Working Drawing Submission: It is the responsibility of the A/E to provide a project specific design. Performance criteria do not meet the intent of this section.

- 725.2.1 Drawings:** Provide the following minimum to demonstrate compliance with the requirements of the code:
1. Locate and identify the Fire Resistance Rating of all fire and smoke dampers
 2. Locate and identify all ceiling radiation dampers in rated ceilings
 3. Provide a typical fire damper detail indicating damper, sleeve, method of support, fusible link, duct access door and a break-away joint between the sleeve and the connecting duct.
 4. Provide a note stating that each shall be installed in accordance with the conditions of their listing and the manufacturer's installation instructions.

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725.2.2 Specifications: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide complete specifications respective of the project Scope of Work.
2. Provide a description of the Acceptance Testing Requirements. Indicate which of the Acceptance Tests are to be witnessed by the Regional Office of the State Fire Marshal.

725.3 Validation of the Fire and Smoke Dampers: Fire & Smoke Dampers are to be Acceptance Tested in accord with the requirements of the code. The Regional Fire Marshal's Office shall observe the installed Fire & Smoke Dampers and witness the Fire Alarm System Performance Tests. The A/E and Contractor shall certify that the Fire Alarm System is complete.

SECTION 726.0 FIRE SEPARATION for EQUIPMENT

Direct fired heating equipment and make-up air heating equipment shall be separated from other air handling equipment by a one hour fire-resistance rated wall.

Exceptions:

1. Combination heating and cooling equipment need not comply to the above if the heating and cooling equipment is an approved single package or tandem unit.
2. Buildings of Use Group R-3.

SECTION 727.0 FIRE PUMPS

This section defines the requirements and methodology for designs which include Fire Pumps within the Fire Suppression System. This section is specific to the Fire Pump and its ancillary components. See Section 701.0 Building Code & Application of Requirements for Shop Drawings review procedures. See Chapter 9 of this Manual for issues not related to code compliance.

727.1 Responsibilities: The A/E shall provide complete project specific drawings and specifications that define a code compliant Fire Sprinkler System which include automatic Fire Pump(s). Changes to the design during the Construction Phase of the project shall be considered Substitutions in accord with the General Conditions. Changes shall be documented by Change Order and shall be submitted to the Building Official for review. The A/E shall assure that code compliant Fire Suppression Systems(s) are provided through the review of the Shop Drawings and the observation of the progress and quality of the work. The A/E shall confirm that the Fire Pump installation is complete and results in a code compliant Fire Sprinkler System.

727.2 Application of Fire Pumps in Fire Suppression Systems: A Fire Sprinkler/Standpipe Suppression System is to provide a reasonable degree of protection for life and property from fire based on sound engineering principles, test data, and field experience. One key component of the system is a reliable water supply of acceptable volume and pressure. The connection of the Fire Suppression System to a Public Water Supply that is of acceptable volume and pressure is considered to be the most "Reliable Water Supply". Where the Building Characteristics are such that the Water Supply Requirements of the designed Fire Suppression System can not be provided by the available Water Supply then the

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incorporation of an automatically controlled fire pump into the Fire Suppression System, compliant with NFPA 20 *Standard for the Installation of Stationary Pumps for Fire Protection*, shall result in an “Acceptable Water Supply.”

Sound Engineering Principles are to be incorporated into the design of the Fire Suppression System to result in the most Reliable and Acceptable Water Supply for the project.

727.3 Electrical Requirements: Fire Pump Electrical Components and systems shall comply with the *National Electric Code* (NFPA 70) Section 695 – *Fire Pumps*.

The Power for fire pumps shall be from a service which is both electrically and mechanically separate from the remainder of a building’s power supply.

727.4 Emergency Electrical Systems: Fire Pumps are considered to be an Emergency System and shall comply with the additional electrical requirements of the *National Electric Code* (NFPA 70) Section 700 *Emergency Power*, where the following condition(s) occurs:

1. The building is more that 75 feet in height, or
2. The building has a total Assembly Design Occupancy Load that exceeds 1000 people, or
3. The building is designated as an Emergency Shelter (VUSBC Section 1604.5), or
4. Electric motor driven fire pumps are used and the height of the structure is beyond the capacity of the Fire Department Apparatus.

727.5 Working Drawing Submission: It is the responsibility of the A/E to provide a project specific design. Performance criteria do not meet the intent of this section.

727.5.1 Drawings: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Show the location of the Fire Pump, Pressure Maintenance Pump, Pump Controllers, piping, components and piping specialties.
2. Provide details of the Fire Pump, Pressure Maintenance Pumps, Pump Controllers, suction piping, discharge piping, components and piping specialties.
3. Provide a table summarizing the water supply characteristics for the most demanding area of each of the Sprinkler Systems supplied by the fire pump. Define the type of Sprinkler System(s), Water Flow and Pressure requirements for each Area of Coverage, Hose Stream Allowances for each area, resulting Total Water Flow and Pressure Requirements for each area of coverage, Water Supply (Flow & Pressure) available, fire pump, resulting available Water Supply, resulting safety factor in psig for each Sprinkler System.
4. Provide a small scale drawing showing locations of water hydrants, test and flow hydrants (for waterflow tests), and routing of underground pipe. Indicate the Waterflow Test results, the date and time taken and who conducted the test. Indicate the Water Supply (Flow & Pressure) at a reference point common with the Sprinkler /Standpipe System Design.
5. Show and identify all existing Sprinkler Systems and Standpipe Systems in the vicinity of the fire pump(s).

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6. Show and indicate all new connections to existing systems.
7. Show the location of the Fire Department Connection(s) with all interconnecting piping back to the Fire Pump.
8. Show the location of the Fire Pump Test Header and all interconnecting piping.
9. Show the location of the electrical components of the Fire Pump, Driver, Fire Pump Controller, and ancillary electrical components.
10. Show the location, size and routing of the conduits and conductors serving the Fire Pump, Driver, Fire Pump Controller, and ancillary electrical components.
11. Provide details of the electrical components serving the Fire Pump, Driver, Fire Pump Controller, piping, components and piping specialties.
12. Where multiple fire pumps or multiple sources of power are required, provide a diagram on the drawings that defines all of the applicable components and defines the sequence of operation.

727.5.2 Specifications: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide complete Specifications to reflect the Systems that are defined on the Drawings.
2. Provide wording in the Specifications that indicate that the modifications to the Fire Pump and ancillary components are not to be altered by the Contractor, without prior written approval by the A/E and the Building Official. Changes to the design depicted within the Construction Documents shall be considered Substitutions in accord with the General Conditions and are to be documented by Change Order.
3. Provide a description of the Acceptance Testing Requirements. Indicate which of the Acceptance Tests are to be witnessed by the Regional Office of the State Fire Marshal.

727.5.3 Calculations: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide Hydraulic Calculations that demonstrate that the most hydraulically demanding Zone(s) of the Fire Sprinkler System(s) is satisfied by the Automatic Water Supply (water supply plus fire pump) compliant with the requirements of NFPA 13, NFPA 14, and NFPA 20.
2. Where the height of the structure is beyond the capacity of the Fire Department Apparatus, provide hydraulic calculations that demonstrate the performance of the Standpipe System(s) as connected to the Automatic Water Supply (water supply plus fire pump) compliant with the VUSBC, NFPA 13 & NFPA 14.

727.5.4 Existing Fire Pumps: Where an existing Fire Pump is to be used in the project, its performance and condition is to be established and validated. This is to be accomplished by submitting a copy of the recent Report of the Fire Pump Inspection, Testing, and Maintenance compliant with Section F-516.6 the *Virginia Statewide Fire Prevention Code: Fire Pumps - Inspection, Testing, and Maintenance* as a part of the Working Drawings Submission. Section F-516.6 requires that Fire Pumps be inspected, tested, and maintained in accordance with NFPA 25. Table 8.5.3 *Summary of Fire Pump Inspection, Testing and Maintenance* of the current edition of NFPA 25 *Standard for Inspection, Testing, and*

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Maintenance of Water Based Fire Protection Systems defines the parameters for the Report. The performance and condition of the Fire Pump is to be validated on an Annual basis.

- 727.6 Shop Drawings Review:** Shop Drawings (Product Data, Sketches and Certified Shop Test Pump Curves) are to be reviewed by the A/E of Record for compliance to the Project Contract Documents and the code. At the conclusion of the Shop Drawing review, the A/E of Record shall:
1. Verify the Underwriters Laboratories (UL) Listings and Classifications for the materials, components, and equipment provided for this project result in a code compliant Fire Pump System.
 2. Provide a “Sealed” Statement, attached to the reviewed Shop Drawings indicating that the Fire Pump Shop Drawings (Product Data, Sketches and Certified Shop Test Pump Curves) satisfy the requirements of the Project Contract Documents, the VUSBC and NFPA 20.
 3. Provide the Regional Office of the State Fire Marshal copy(s) of the approved Fire Pump Shop Drawings.
 4. Provide DEB/BCOM a copy of the “Sealed” Statement and a copy of the transmittal to the Regional Office of the State Fire Marshal.
- 727.7 Validation of the Fire Pump:** The Fire Pump(s) is to be Acceptance Tested in accord with the requirements of the code. The Regional Fire Marshal’s Office shall observe the installed Fire Pump and ancillary components. The Regional Fire Marshal’s Office shall witness the Fire Pump Performance Tests. The A/E and Contractor shall certify that the Fire Pump installation is complete.

SECTION 728.0 SMOKE CONTROL SYSTEMS

This section defines the requirements and methodology for the development of Smoke Control System design. See Section 701.0 Building Code & Application of Requirements for Shop Drawings review procedures. See Chapter 9 of this Manual for issues not related to code compliance.

- 728.1 Responsibilities:** The A/E shall provide complete project specific drawings and specifications that define a code compliant Smoke Control System. Changes to the design during the Construction Phase of the project shall be considered Substitutions in accord with the General Conditions. Changes shall be documented by Change Order and shall be submitted to the Building Official for review. The A/E shall assure that code compliant Smoke Control System(s) are provided through the review of Shop Drawings and the observation of the progress and quality of the work. The A/E shall confirm that the Smoke Control System(s) is complete and code compliant.
- 728.2 General Design Requirements:** The VUSBC requires Smoke Control Systems to be designed in accordance with the applicable sections of the VUSBC and the generally accepted and well-established principles of engineering relevant to the design. The “generally accepted and well-established principles of engineering” recognized by the CPSM for this purpose are the current editions of NFPA 92A *Recommended Practice for Smoke Control*, NFPA 92B

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Guide for Smoke Management Systems in Malls, Atria and Large Areas, and The Principles of Smoke Management (ASHRAE/SFPE).

728.3 Selection of Smoke Control System: The VUSBC defines 3 methods of Smoke Control. These are 1) Pressurization Method, 2) Airflow Design Method, and 3) Exhaust Method. The Building Official's Approval is required for the use of any of these Methods within a project.

Agencies and/or their A/E shall contact the Building Official early in the design phase to obtain the approval of the Building Official for the method of Smoke Control for the project.

The Agency and/or their A/E shall submit a narrative that compares and contrasts the 3 methods to the project conditions which results in a recommended method. Provides conceptual floor plans which identify the locations of the major components, pertinent calculations, sequence of operation and any other information that may assist in the evaluation of the methods are to be included in the documents submitted to the Building Official

728.4 Working Drawing Submission: It is the responsibility of the A/E to provide a project specific design. Performance criteria do not meet the intent of this section.

728.4.1 Drawings: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Locate and identify all of the walls, floors and ceilings that define the perimeter of the space(s) to be protected by the Smoke Control System.
2. Locate and identify the HVAC System Components respective to the Smoke Control System.
3. Locate and identify all Smoke Dampers respective to the Smoke Control System.
4. Locate and identify all Motorized Dampers respective to the Smoke Control System
5. Locate and identify the interface requirements with the Fire Alarm System.
6. Locate and identify the interface requirements for all devices whose operation is required by the Smoke Control System such as Door Hold Open Devices, Smoke Dampers, Fire Shutters, Motorized Ventilation Dampers, Fans, Air Handlers, and Smoke Detectors.
7. Where required by the VUSBC, identify the Primary and Secondary Power Supplies and Connections.

728.4.2 Specifications: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide wording in the Specifications that indicate that the components of and their locations which make up the Smoke Control System are not to be altered by the Contractor, without prior written approval by the A/E and the Building Official. Changes to the design depicted within the Construction Documents shall be considered Substitutions in accord with the General Conditions and are to be documented by Change Order.
2. Provide a description of the Acceptance Testing Requirements. Indicate which of the Acceptance Tests are to be witnessed by the Regional Office of the State Fire Marshal.

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728.4.3 Calculations: Provide the following minimum to demonstrate compliance with the requirements of the code:

1. Provide calculations that demonstrate the volume of the spaces respective of the Smoke Control System.
2. Provide calculations as defined by the “generally accepted and well-established principles of engineering” referenced by this CPSM section that establish the performance requirements for the Method of Smoke Control for this project.

728.5 Shop Drawings Review: The Shop Drawings (Working Plans, Product Data and Calculations) of the components that result in the Smoke Control System are to be reviewed by the A/E of Record for compliance to the Project Contract Documents and the code. At the conclusion of the Shop Drawing review, the A/E of Record shall:

1. Verify the Underwriters Laboratories (UL) Listings and Classifications for the materials, components, and equipment provided for this project result in a code compliant Smoke Control System.
2. Provide a “Sealed” Statement, indicating that the Shop Drawings submitted for the Smoke Control System (Working Plans, Product Data and Calculations) satisfy the requirements of the Project Contract Documents, the VUSBC, and the applicable NFPA Standard (cite the applicable NFPA Standard as referenced by the CPSM).
3. Provide the Regional Office of the State Fire Marshal copy(s) of the complete approved Smoke Control Shop Drawings with a copy of the “Sealed Statement”.
4. Provide DEB/BCOM a copy of the “Sealed” Statement and a copy of the transmittal to the Regional Office of the State Fire Marshal.

728.6 Validation of the Smoke Control System(s): The Smoke Control System(s) are to be Acceptance Tested in accord with the requirements of the code. The Regional Fire Marshal’s Office shall observe the installed components of the Smoke Control System(s) and witness the Smoke Control System Performance Tests. The A/E and Contractor shall certify that the Smoke Control System is complete.

SECTION 729.0 SPRINKLER HEAD DATABASE

All state agencies shall compile the information and maintain the DEB Sprinkler Head Database of information on all fire protection sprinkler heads installed in each of its buildings. The Database is web based and the URL is <http://deb.dgs.virginia.gov/brpm/sprinklersystem/>

729.1 General: Manufacturers of sprinkler heads sometimes discover malfunctions in their products and issue notices for recall, repair or replacement. Such notices often have a limited response time to receive free or reduced cost remedies. To facilitate timely responses by state agencies, it is essential that agencies maintain the DEB database of sprinkler head information on all sprinkler heads installed in its facilities, both existing and new. The Database should be updated whenever a new building is ready to occupy; whenever the Fire protection system is added to, upgraded or replaced in existing facilities; and whenever the sprinkler heads in an existing system are replaced for whatever reason.

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729.2 Format Requirements: Sprinkler head information shall be recorded and maintained by the agency using the web based application developed by DGS . Sprinkler head data for each existing building shall be compiled and recorded in the Sprinkler Inventory electronic Database by December 31, 2004. Data on replacement heads shall be entered to update the inventory as changes occur. Data on sprinkler heads installed in new facilities / buildings and on new sprinkler systems installed in existing facilities shall be recorded as part of the acceptance of the sprinkler system.

729.3 Submission of information: The Agency shall maintain the record copy of the Sprinkler Inventory for each of its buildings. The Agency shall use the Web enabled database provided by DGS, as the sole vehicle for compliance to the BCOM Sprinkler head Database mandate.